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TO BUILD OR NOT TO BUILD. A REPORT ON THE UTILIZATION AND PLANNING OF INSTRUCTIONAL FACILITIES IN SMALL COLLEGES.

BY- JAMRICH, JOHN X.
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DESCRIPTORS- *JUNIOR COLLEGES, *EDUCATIONAL FACILITIES, COLLEGE PLANNING, COLLEGE BUILDINGS, SPACE UTILIZATION, CAMPUSES,

A SOLUTION TO PROBLEMS OF GROWING COLLEGE ENROLLMENTS IS TO INCREASE THE EFFICIENCY OF USE OF EXISTING SPACE TO MAKE ROOM FOR MORE STUDENTS, RATHER THAN TO RESTRICT ENROLLMENTS OR TO CREATE MORE SPACE. PLANNING OF COLLEGE FACILITIES MUST INCLUDE ANALYSIS OF THE PRESENT PLANT, THE INSTRUCTIONAL PROGRAM, THE STUDENT BODY, AND THE FINANCIAL STRUCTURE. ON A WELL PLANNED CAMPUS, FACILITIES ARE ZONED ACCORDING TO FUNCTION. FACILITY UTILIZATION IS A FUNCTION OF THE EXTENT OF SPACE PROVIDED, ROOM-PERIOD UTILIZATION, AND STUDENT STATION UTILIZATION. IMPROVEMENT OF UTILIZATION IS A FUNCTION OF CLASS DISTRIBUTION, LENGTH OF THE WEEK, THE SCHOOL YEAR, CURRICULUM UNITS AND CREDITS, RELATIONSHIP OF CREDITS AND CLASS HOURS, LABORATORY SPACE, FLEXIBILITY OF CLASSROOMS, PROLIFERATION OF COURSES, PROPRIETARY ATTITUDES OF STAFF, AND PRESSURES FOR MORE SPACE. A SPACE UTILIZATION WORKBOOK IS INCLUDED. THIS DOCUMENT IS ALSO AVAILABLE FROM EDUCATIONAL FACILITIES LABORATORIES, 477 MADISON AVENUE, NEW YORK, NEW YORK. (WO)

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A Report on the Utilization and Planning of Instructional Facilities in Small Colleges

Based on Research by **JOHN X. JAMRICH** *Assistant Dean, College of Education, Michigan State University* edited by Ruth Weinstock

A REPORT FROM EDUCATIONAL FACILITIES LABORATORIES

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Well, the folks up in Maine say that when he was born, he outgrew his cradle before he was a week old.

'What'll we do?' said Paul's mother. 'That old cradle's always been big enough for the other children, and they weren't so puny either.'

'Can't you starve him a little, maybe?' asked his father. 'The way he goes after food he'll eat us out of house and home – and then eat the house, too.'

'Don't be silly,' said his mother . . . 'A growing child has got to grow. That's what he's here for.'

'Well,' mumbled Paul's father . . . 'I don't see exactly what you expect me to do about it when I've got a thousand things to do and you know –'

'I expect you to stop dragging your muddy boots all over my clean kitchen and get out your carpenter tools and fix up a bigger cradle,' said Paul's mother. And then she began to mop up the floor to show him there was no time to be wasted standing around.

THE WONDERFUL ADVENTURES OF PAUL BUNYAN
RETOLD BY LOUIS UNTERMEYER

The student body in America's colleges is growing so rapidly that it will soon outstrip the existing space for learning in today's classrooms and laboratories.

There are three conventional ways of dealing with this problem. ONE, shrink or limit the student body so that it will fit the present available space – a solution inconsistent with the aspirations and needs of our democratic society. TWO, increase the facilities to accommodate the growth – a solution, if fully executed, out of keeping with the size of either private giving or the public purse. THREE, increase the efficiency of use of existing space to make room for more students, thereby reducing the quantity of new space to be built.

It is with the third solution that this report is particularly concerned.

The Problem. It is a matter of common knowledge that within the next decade there will be twice as many young people attending colleges and universities as there are at the present time. The expectation is that by 1970 enrollment figures will approach the seven million mark. Along with the rise in enrollment there has been and will continue to be an increase in the costs of building, operating, and maintaining institutions of higher learning. The dollar figures representing expenditures for the physical facilities of education are as staggering as the enrollment figures.

Between 1951 and 1955 higher education enrollments increased more than half a million (562,183). During the same period nearly $1.8 billion ($1,782,572,000) was spent for the construction of new buildings. In other words, for every new student enrolled $3,170 was expended just for building space. Of this amount $1,455 accounts for instructional space – classrooms and laboratories. The remainder was invested in research facilities or spent for auxiliary, residential, and general purposes.

Some portion of this money was used to replace obsolete or inadequate facilities, and it is reasonable to assume that the same proportion for replacement or modernization of facilities will continue to be necessary. Therefore the unit cost of $3,170 per student is a conservative estimate (bearing in mind the probable increase in construction costs) of the amount that will be required for each new student who will enter the portals of our higher institutions of learning.

On this basis, at the rate of over 3 million new students between 1955 and 1970, taxpayers, legislators, and private donors will need to produce over $10 billion for capital outlay. *This figure exceeds the present total value of the combined physical plant of all types in all the colleges and universities of the United States.* In 1955, the U.S. Office of Education

reported the value of the entire higher education physical plant in use to be just below $9 billion ($8,901,825,244).

An anticipated dollar outlay of this magnitude is by itself ominous enough. But physical facilities are only one aspect of the operations, financial and otherwise, of an educational institution. Additional elements of even greater importance, such as faculty salaries or instructional equipment, must be added to this load. Space for learning is something which must be provided in order for educational institutions to go about their primary business: conducting education. But where the use of space is not properly controlled and planned, inordinate sums of money may be required for additional space. By usurping a disproportionate amount of limited funds, new facilities could dictate more fundamental considerations such as the quality of teaching staffs or student admissions practices. There is a danger here that the tail may wag the dog.

One of the findings of the present study is that many institutions do their planning in a haphazard, unsystematic, and informal manner. Under the best conditions such procedure is expensive. Under conditions of acute and conflicting demands on an institution's limited resources, one need is usually satisfied at the expense of another.

Classrooms and laboratories without adequate teachers are an obvious absurdity. On the other hand the decision to maintain faculties of high standing could mean that institutions may be forced to close their doors to qualified young people, limiting enrollment not as a matter of policy, but because they simply do not have enough seats.

Never before has there existed such an urgent need for total, systematic planning. Only by careful evaluation of the separate functions and operations of an institution can the parts be assembled into a balanced whole. Therefore, while this report deals primarily with physical facilities, the subject is set against the total conduct of higher education.

To build or not to build is a big decision. Too much is involved to make that decision lightly and then go blithely tripping into the future, cheered by the evidence of bulldozers and cement mixers on the campus, proclaiming that business is good. The solid weight of all other needs imposes the obligation to first ask:

1. Is this expenditure necessary?
2. If it is, how can we be sure to get the most for our money?

Answers to these questions don't come easily. Only an informed look into the use of existing facilities can reveal whether those facilities are being used efficiently and whether they can be employed to yield additional use so as to reduce, or even render unnecessary, the need for new buildings. That informed look, in the jargon of educational planners, is a "space utilization study".

Space utilization studies are usually regarded as complicated, knotty affairs. The very sound of the phrase has moved many a college administrator to reach for the nearest phone to ring up a consultant. In large universities the job is sometimes approached by the establishment of an administrative office set up especially to manage university space. But small colleges, those with under 3,000 students, cannot afford such overhead. These smaller institutions constitute a large part of higher education. They enroll roughly 25 per cent of all college and university students in the United States. Many of them need assistance so that they can do the job themselves.

This report is for them. Here is how it will help.

Purpose and Scope. Compiled in these pages is an intensive collection of data assembled from over 60 four-year, degree-granting, liberal arts colleges in the north central region of the United States, all of them with enrollments of under 3,000. (But the implications of these data apply to large liberal arts colleges as well.)

Administrators familiar with the Russell-Doi *Manual for Studies of Space Utilization in Colleges and Universities,*[1] which is a classic work in its field, will find that this report is its direct descendant. The material presented there covers norms for space utilization in a variety of institutions and is mostly for the year 1953. Here the information is for smaller colleges alone, and was gathered some half a decade later when the pressure from increasing numbers of student applicants was greater. In addition to an entire range of facts about the use and extent of plant and instructional space, the information covered here also includes normative material on enrollment trends, curricula, faculty and faculty salaries, teacher-student ratios, class size, and financing.

These data should be an aid to other liberal arts colleges embarking on their own space utilization studies. One, they will provide those colleges with a basis for comparing the use of their own plant with the practice and experience of comparable institutions. Two, the interpretation of the data provides guide lines for strategic planning by signalling traps and pitfalls, by pointing up areas that may become critical.

For example, the nationwide supply and demand situation in regard to faculty salaries indicates that within the next 10 or 15 years salaries will have to be doubled or even tripled. But one item of intelligence revealed by the data here informs us that the increase in teacher salaries being planned by the small colleges comes to only 59 per cent. This discrepancy signals a potential problem.

Another item: Analysis of the type of space being provided discloses that liberal arts colleges are planning to build four times as much laboratory space as may be necessary.

Or still another: The colleges may not be aware that one-fourth to one-third of all existing facilities are now inadequate and will need to be replaced. Upping utilization will help considerably. It could make it possible for the colleges in this study to accommodate 50 per cent more students without new buildings and save $15 million in capital outlay. But it will not solve the total facilities problem. And underestimating the inadequacy of present facilities is resulting in an underestimation of the amounts of money that will be required for all new construction.

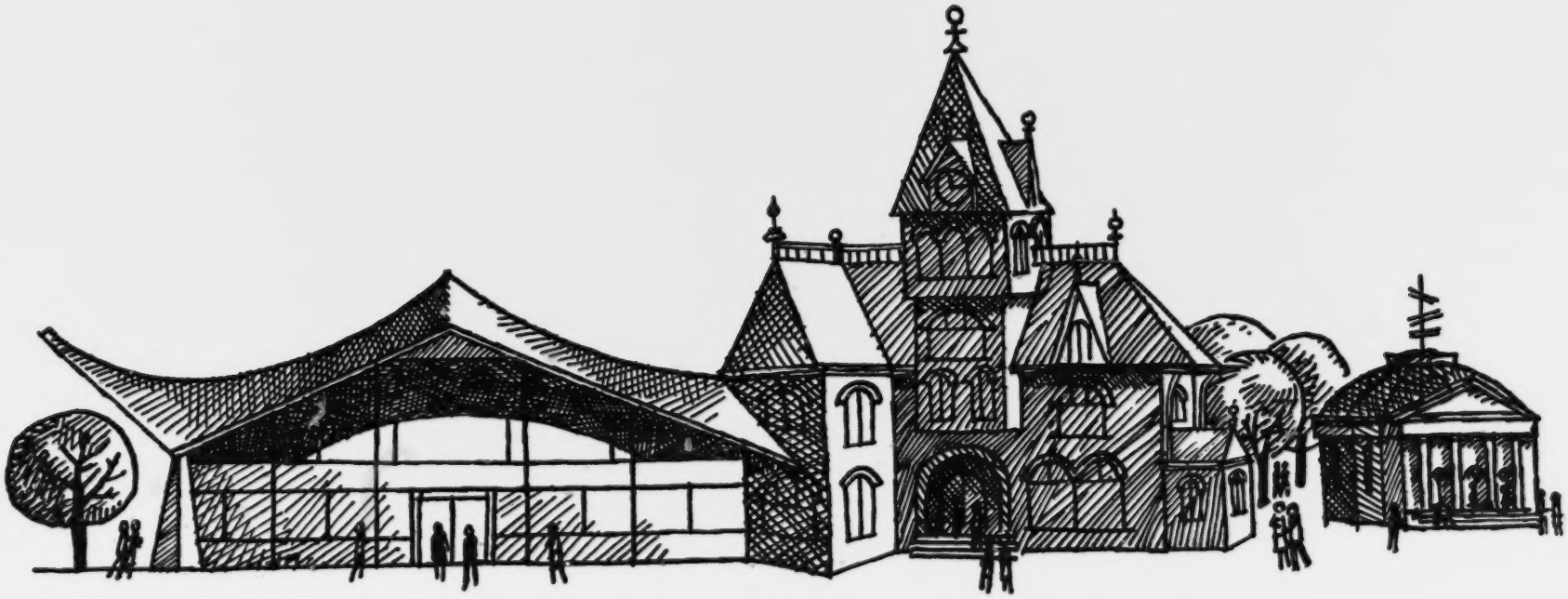
A unique aspect of this report is its "workbook" character. We hope that planners will find extremely useful the do-it-yourself manual which may be detached from the main body of the report. This manual provides each college with a set of forms for conducting a self-study of utilization. Included are detailed instructions as to how they should be used. Normative figures are noted on the individual forms so that when the local information is filled in, a particular college can readily ascertain whether it departs markedly from standard practice in similar colleges, and thus pinpoint what is divergent.

Further, because this report would be incomplete without a discussion of the total planning process, such a chapter is included. It precedes the other material since it suggests an administrative setup for the planning procedure, the over-all institutional factors which must be taken into account, and a sequence for unifying all the relevant considerations.

This study was planned, directed, and carried out by Dr. John X. Jamrich, Assistant Dean, College of Education of Michigan State University, and his assistants. It was made possible by a grant from Educational Facilities Laboratories, whose continuing concern has been the physical facilities of education. This assistance was given in the hope that the material uncovered and collected by the study would sensitize college administrators to the over-all nature of the planning problem, and also provide some of the tools to help with the task.

(1) John Dale Russell and James I. Doi. **Manual for Studies of Space Utilization in Colleges and Universities.** American Association of Collegiate Registrars and Admissions Officers; Ohio University, Athens, Ohio, 1957.

1



THE PLANNING PROCESS

Who Does It. New college buildings do not spring up on the scene full blown like Minerva out of Jupiter's head. They have a past. If the past has been a good one, they also have a future. A good past in the case of a college building is one in which all the reasons for its being have been taken into account. The building that results is a synthesis of those reasons; a physical translation of the academic philosophy, policies, expectations, and needs of a particular institution.

The procedures used to analyze those needs and expectations may be as varied as the final building-shapes they mold, but there are certain basic considerations which are common to them all. These considerations represent factors that are inseparably intertwined. To consider any one group of them in isolation from the others is to consider only a portion of the total problem. To deal with the total problem requires a total study of all the facets and functions of an institution. And that is not a simple matter.

Because the total problem is so complex, large colleges and universities often set up a special office of institutional research or planning whose sole purpose is to carry on studies related to policy matters. Small colleges, however, are not ordinarily in a position to provide such an office since the expense is out of proportion to the over-all institutional operation. They therefore often resort to the alternative of bringing in personnel from the outside to do the job for them. No doubt outside consultants can do an adequate study of an institution. But there are decided disadvantages in handing a project out and getting back a detailed set of blueprints for the future of the college. First, such a procedure does not capitalize on the competencies or the peculiar and intimate knowledge of the regular faculty and staff. Secondly, it does not encourage acceptance of the results of such studies by college personnel as readily as if the study had been carried out on the campus. In addition, it does not provide for the continuation of such studies by the college. For these reasons, even where outside professional planning consultants are used by the institution, substantial involvement of continuing members of the faculty and administrative staff should be encouraged.

Obviously, other ways have to be explored by the small colleges that will provide them with a more appropriate means of getting the job done. One such method is recommended here. It has the virtue of circumventing a common weakness — that of placing all the responsibility for planning with but a segment of an institution's personnel, namely the president and board of trustees. The findings of this study indicate that while faculties are occasionally

consulted, more often than not the boards of trustees and presidents have proceeded well down the road of decision before asking for faculty recommendations — and at that, these are confined to specific suggestions for a particular building already decided upon.

A Way To Do It. Since total planning requires total representation of all the functions and needs of an institution, a most logical procedure is the establishment of a faculty-administration-board of trustees committee. Clearly no single group could take on so big a job by itself. Subcommittees would have to play an important role. Moreover, the primary committee would have to be provided with sufficient funds to call upon competent consultants for a measure of expert help in each of the areas being studied — educational or planning consultants for plant, program, students and finances; architectural, planning, and financing consultants at the later stages when the need, location, and design of buildings are identified and undertaken. But it is primarily this committee that would be responsible for the leadership necessary to study, relate, and coordinate all the findings into a unified whole.

Not only are the final results of such a procedure more likely to be of a total nature, but they are also more apt to reflect the unique traditions and aspirations of each institution.

Putting The Parts Together. Though the need for considering all the relevant factors before embarking on a building program seems self-evident, the fact is that it is not commonly done. Of 124 colleges who were asked about their planning in the course of this survey, only 12 had undertaken intensive total studies. Twenty-nine had no studies planned at all; 44 had only enrollment projections going; 28, only curricular studies; 11, studies of the adequacy and utilization of their plant.

The fragmented approach indicated by these figures may be due to ignorance of all the factors that must be evaluated as well as lack of knowledge of how to coordinate all the related parts. Take the fact, for example, that the largest number of colleges polled had undertaken only enrollment projections. The obvious inference to be drawn from this is that in planning to provide for a certain additional number of students, they intend to do so by simply reproducing their present plant, faculty, and curriculum in proportion to the student increase.

Nothing could be farther from the realistic needs in many of the colleges, and certainly nothing could be fraught with more financial hazards than this type of reasoning.

A detailed look at such factors as the scope of the curriculum, the number of different majors offered, the size of classes, and the extent to which the curriculum is proliferated, is as important as the fact that enrollment may double, triple, or be limited to its present level. Without such a detailed picture of an institution, the matter of enrollment has only limited meaning as regards the need for new buildings.

But an enrollment projection even with these factors taken into account is still inadequate for determining future space needs. This is why. The *nature* of the anticipated enrollment has implications for the curriculum, for instruction, and for the resultant staff requirements. These in turn affect the financial base from which a college can move toward providing new buildings. Therefore a simple head count that describes only the total number of expected students without describing what kind they will be, runs the danger of overbuilding in some curriculum areas, underbuilding in others, or providing facilities for the very specialized needs of a few students at the expense of the total instructional program.

A Sequence. The way these disjointed parts can be made to fall into an orderly sequence will not be identical for any two institutions, since each college has a personality and set of traditions unique unto itself. But here is one such possible sequence.

Let us assume that a college enrolling 600 students has set a tentative future enrollment figure of 1,200, this level reflecting some notion of "operational efficiency" and the "smallness becoming a small college". Of course one might logically proceed, on the basis of such an arbitrary decision, to just as arbitrarily decide that the college therefore needs an additional classroom building with eight classrooms, three instructional labs, and enough faculty office space to provide for the additional staff required. Or one might mathematically decide that 1,200 students require double the facilities and staff required by 600 students.

In the first place, the need for additional building, even if no enrollment increases were planned, would be affected by the character of the existing facilities. Therefore, the following studies should be undertaken.

1. A detailed analysis of the present instructional plant to assess its adequacy for the present level of enrollment, as well as an analysis of present utilization in order to find out the number of additional students who might be accommodated with better use of these facilities.

2. Now, the adequacy of present facilities is not determined only by their structural character, but also by their adequacy for the instructional program of the college. Thus, a thorough and detailed analysis of the instructional program becomes an integral part of the planning process.

In a soundly administered college the function of instruction is generally recognized as the central purpose for which most other services are organized and maintained. From a budgetary point of view, the effort is to hold supplementary services, such as administration and plant operation and maintenance, at the lowest possible level of expenditure consistent with good service to the instructional program. This then leaves a maximum share of the funds for direct instructional operations.

As a feature of the appeal for larger supporting funds to attract and maintain capable faculty members, each institution needs to have assurance that it is making the best possible use of the funds being spent on its instructional program. Such assurance requires an analysis of certain aspects of that program, such as the size of classes, the faculty teaching load, and the unit expenditures for instruction.

3. Concurrently with the study of the instructional program and the physical plant, there should be undertaken a detailed study of the characteristics of the students who attend and have attended the institution. This study would include the geographical origin of the students, their economic and social backgrounds, their professional and vocational goals, the retention and attrition rates of the college during the past years, and some measure of the alumni satisfaction with the effectiveness of the college's program.

4. The fourth area which should be studied concurrently with the first three relates to the financial structure. A careful analysis of the trends in income and expenditure should be made to show the primary sources of funds and the proportionate expenditures of these funds for the various functions of the college operation.

5. The usefulness of these studies for decisions regarding the need for facilities will depend upon interrelating the results of each of the studies, one with the other. Here are some of the broad questions these investigations should answer.

A. What are the most productive areas of study for the type of student the college now has?

B. What is the rate of attrition? What factors determine this rate, and how may it be modified, if, indeed, it should be modified?

C. Is the scope of the present curriculum in keeping with the primary preferences and needs of the present students?

D. Is the present curriculum too diversified or proliferated for the demand? How is this re-

flected in the cost of instruction in the specific areas of study?

E. In line with the objectives and purposes of the college, can the size of class be increased in certain areas without jeopardy to educational effectiveness?

F. How stable is the present source of income? Are tuition fees high enough? Are faculty salaries competitive with those of other colleges seeking the same type of faculty members?

G. How extensive is the present plant?

H. How adequately do the present instructional facilities service the instructional program?

I. Is the level of utilization of present plant satisfactory or could a higher level of utilization, commensurate with the educational objectives, provide facilities for additional students without additional construction?

6. These and many other questions must be answered before attention is returned to the tentative enrollment level with which the study started. Very important is the need to assess possible new geographical or constituent areas of service from which additional students could be drawn. Then, in terms of the present area of service, the question is posed as to whether 1,200 is a realistic goal; whether it should be lessened, or on the other hand, increased to a higher level. It is possible that in the case of a college under church control, for example, the obligation to render continuing service to the church constituency would demand raising the level to 1,500 or 2,000.

The studies of the present students, alumni, and potential student sources, will provide the basis for finally ascertaining a realistic level of enrollment.

7. This new enrollment figure, then, must be translated into specifics regarding the curricular and program areas in which the higher enrollment will occur. Thus, the college must establish the scope of the curriculum in terms of the number of different majors and the number of different courses it plans to provide for this level of enrollment.

8. Having established a level of enrollment and the scope of the curriculum, it is possible to determine the extent of the instructional plant and number of faculty members that will be required. Comparing the new facility needs with the existing plant will determine the extent of new construction that will have to be provided.

9. Assuming that all this adds up to a need for a new instructional facility, the specific nature of this building must then be determined. At this point, the appropriate faculty and administrative committee, with the assistance of a competent architect, should embark on the determination of the exact type of building required including its size, location, and design.

The entire planning process as thus outlined is summed up in Figure 1. Here the roles of the primary committee and small staff committees appointed to conduct the studies are shown. Also indicated are the possible roles which educational and architectural planners can play and where their most effective contributions can be made. Most important of all, the diagram attempts to portray the inseparable interrelationships among the various institutional factors in the determination of institutional needs of any sort.

NOTE: The most useful and precise description of the procedures to be followed in carrying out a study of an institution's physical facilities is to be found in the Manual for Studies of Space Utilization in Colleges and Universities by John Dale Russell and James I. Doi. See particularly Chapters 4 and 5.

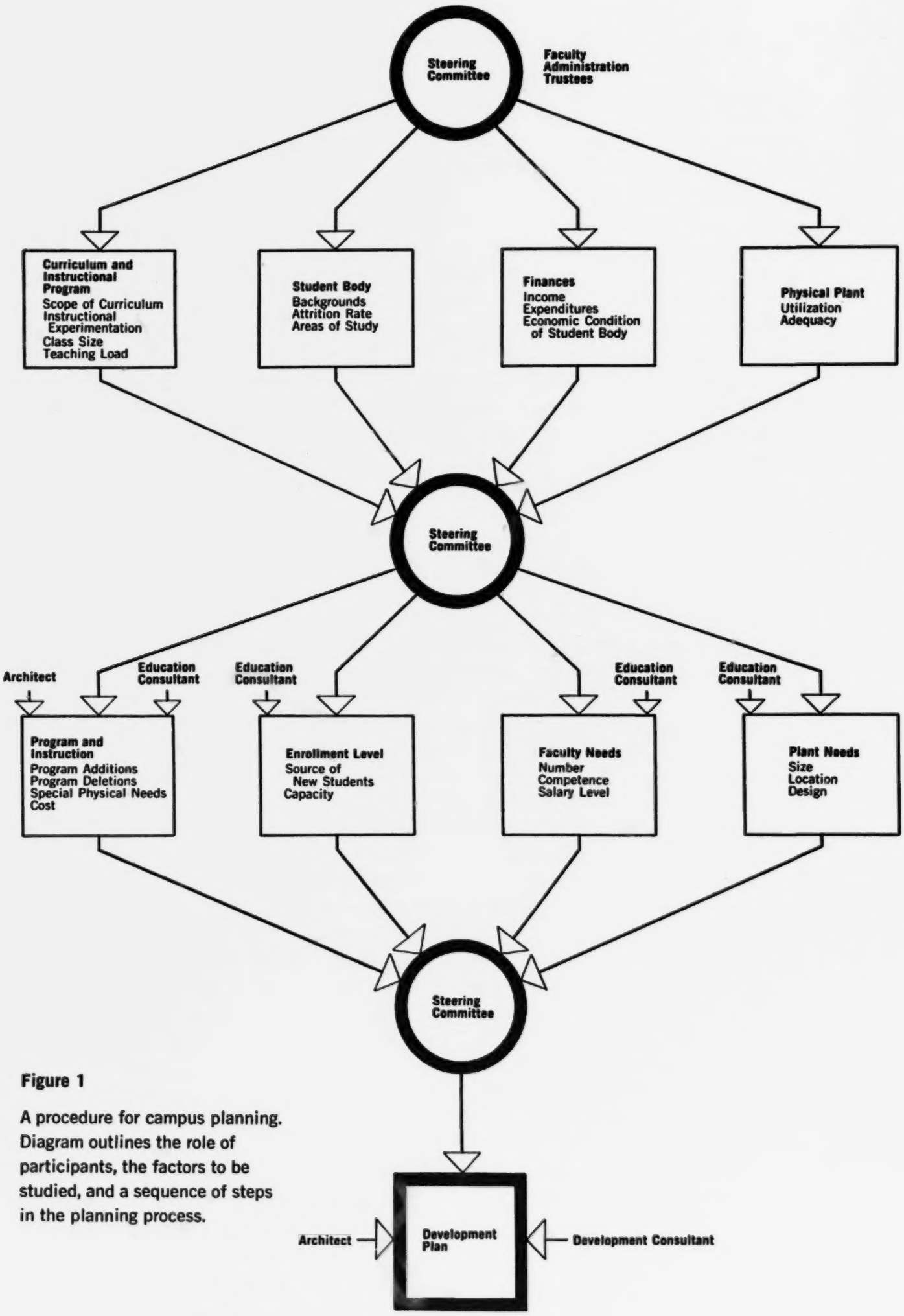


Figure 1

A procedure for campus planning. Diagram outlines the role of participants, the factors to be studied, and a sequence of steps in the planning process.

2
Percentile Rank
81,034 .9 1500-3000
General Class-rooms .6 Total Enroll. 15 97
75 1 1959-60 16.6% Number of Rooms Reported
10.8 123 B
Instructional Laboratories
A 5080
Teaching Labora-tories 25 .5 1,203
1940-1959 1 Percentile 1959-60.
D 27.7% 4
Type Size of Institution 1959-60 Institutions 57,973
4202 108 1348 64
1812 Faculty

DATA:

CHARACTERISTICS AND TRENDS OF SMALL COLLEGES

The preceding chapter discussed the full range of considerations which should be taken into account in the planning of new facilities. This chapter describes the characteristics and trends of these features in the various colleges covered by this study. These data reflect the pattern of change and growth in small colleges within the past 20 years, as well as future growth expectations.

The material here is organized into two sections. The first deals with the institutional, or nonphysical, factors; the second with the characteristics and extent of the physical facilities. The data in each case are accompanied by brief, interpretative comments. The reader is asked to bear in mind that the bases for the numerous computations of data will vary from one section of this report to another. In one case the base may be 53 institutions with a total enrollment of 40,000; in another, 62 institutions with enrollments of 58,000, etc. This is due to the fact that all the colleges in the survey did not respond uniformly to the questions put to them. Consequently, only those that submitted comparable information could be included in any single study of the report.

PART I. Institutional Characteristics

A. Enrollment. Among the colleges polled, over half indicated they had worked out enrollment projections, though they may or may not have considered other matters. It would only belabor the point to emphasize again that future levels of enrollment can only be very tentative until all the other factors are considered. But in the course of setting even tentative enrollment figures, the following specific questions should be asked:

A. Where have past students come from?
B. Where are they coming from now?
C. Are there new geographical areas which the college can or should serve?
D. What have been the most frequent areas of study of past students?
E. What has been the academic potential of the student body (as regards self-study)?
F. What have been the trends in student retention rates?
G. How will future enrollment reflect the state and national trends as to major areas of study?

H. What is a realistic level of enrollment to expect during the next two decades?

I. Given these levels, retention rates, and choice of departmental majors, what can be the expected enrollment in the various classes of the college?

ENROLLMENT TRENDS. The colleges participating in this study were asked to report their enrollments for four points from 1940 to 1959. This information, summarized in Table I, indicates what happened to certain sizes of institutions in those 19 years. It will be seen that as a group they almost doubled the size of their student bodies.

The colleges were also asked whether or not they had established some upper limit to future enrollments. Of those that responded to this question, 75 per cent indicated that a limit had been decided upon, 25 per cent indicated no such limitations. Most frequently the limit was equal to about twice the present size. Interestingly, a policy of not limiting enrollment occurred most often in the largest size-group — those that presently have between 1,500 and 3,000 students.

B. Curriculum and Instruction. Vital to the question of how much and what type of building an institution should undertake is, of course, the matter of curriculum and instructional practices. In this area the important questions that must be asked are:

A. What are the purposes and objectives of the college and how are they translated into operational terms in the classroom and on the campus as a whole?

B. How appropriate is the present curriculum for the above objective purposes?

C. How appropriate is the curriculum for present and future social, technical, and cultural demands?

D. What is the scope of the present curriculum, i.e., the number of courses, the number of majors, and the number of different programs offered?

E. What are the present practices in class size?

F. What are the present practices in faculty teaching load and other responsibilities?

G. How adequate are the supplementary learning facilities such as the library?

H. How do class sizes vary from subject area to subject area; how is this related to the matter of instructional budget allocation and to the stated purposes of the institution?

I. What is the extent of small classes being taught —classes enrolling fewer than 10 or fewer than 5 students?

J. How extensively are large classes utilized in the instructional program of the college?

K. How can educational quality be retained while providing for the needs of students through a more compact and efficient program?

TRENDS. That some recognition of the importance of curriculum study in total institutional planning does exist, is indicated by the fact that of the 67 institutions who were asked if they had a curriculum study currently in process, 40 said yes. The most frequently expressed purposes of such a study were *(1)* revised course structures and *(2)* an evaluation of present courses. In 26 instances new courses or programs were being contemplated.

The colleges were also asked to report the number of semester hours of courses listed in their cata-

TABLE 1 *Enrollment Trends in the Colleges Studied: 1940-1959*

Size of Institution (1959-60)	No.	Total Enroll. 1940-41	Total Enroll. 1950-51	Total Enroll. 1955-56	Total Enroll. 1959-60	Per cent Increase 1940-1959
1500-3000	17	14,288	21,101	23,444	31,971	**123**
1000-1499	18	12,055	16,523	17,410	22,124	**84**
700-999	13	5,359	8,048	8.075	11,160	**108**
400-699	23	7,470	9,875	9,698	12,243	**64**
Less than 400	11	2,016	2,426	2,875	3,536	**75**
TOTAL	82	41,188	57,973	61,502	81,034	**97**

logues, as well as the number of different majors which were offered. Tables 2 and 3, respectively, contain this information.

Table 2 indicates that the largest colleges, those with over 1,500 students, list slightly less than one semester hour of course work per student enrolled. The smallest colleges in the group, those with enrollments of less than 400, indicate almost 2 such semester hours.

Similarly, Table 3 shows that although the largest colleges provide a larger number of majors per institution, the smallest ones – again those with less than 400 students – list an average of 4.3 majors for each 100 students enrolled, or three times as many as the largest ones.

The point here is that the small colleges may be trying to encompass more than is financially workable for them. A highly proliferated curriculum in an institution with limited enrollments results in an extremely large percentage of small classes. This, in turn, may mean more teachers and more instructional space. It is something for the smaller schools to think about.

TABLE 2
Average Number of Semester Hours of Undergraduate Courses Listed in Institutional Catalogues per Student Enrolled.

Size of Institution	Average Number of Semester Hours of Courses per Student Enrolled
1500-3000	.93
1000-1499	.96
700-999	1.29
400-699	1.72
Less than 400	1.98

C. Faculty: Teacher-Student Ratios, Class Size, Salary Trends. It has already been pointed out that translating anticipated enrollment increases into specific needs for additional faculty is not simply a quantitative problem. Involved is the matter of quality, as well as the institutional point of view regarding class size. To get a clear picture of where a college is headed in regard to its teaching staff and budget allotments, it must ask itself these questions:

A. What is the level of preparation of the present staff?

B. Should this be improved?

C. If so, where will the source of such improved staff be found?

D. How many new staff members will be needed in the specific areas of study to replace retiring members?

E. How many new staff members will be needed for the increased enrollments, assuming no change in the present curriculum and instructional program?

F. How many will be needed if certain changes are effected in the curriculum and instruction after careful study?

TABLE 3 *Average Number of Undergraduate Majors Offered in the Colleges of This Study*

Size of Institution (1959-60)	Average Number of Undergraduate Majors per College	Average Number of Majors per 100 Students Enrolled
1500-3000	25.8	1.4
1000-1499	21.0	1.7
700-999	21.7	2.7
400-699	18.8	3.8
Less than 400	13.0	4.3

c. Does the current salary schedule effectively compete for the types of faculty required?

h. What will the level of salaries have to be during the next 20 years to provide for attraction and retention of competent staff?

TEACHER-STUDENT RATIOS. Some of these questions were put to the colleges covered in the study. The answers reveal that though the colleges have increased their teaching staffs, the percentage of this increase during the past 19 years is not so high as is the percentage in increase of enrollments. (See Tables 4 and 1.) This imbalance is further borne out by Table 5, which shows that during the years preceding 1955 the average student-faculty ratio for all institutions remained fairly constant. Between 1955 and 1959 there was a noticeable increase in the ratio, reflecting perhaps a trend to provide instruction through larger classes in some of the institutions. Despite this increase, the year 1959-1960 still shows averages in the teacher-student ratio which range from a low of 12.1 in the smaller colleges (those with 400 or less) to a high of 17.6 in the largest (those enrolling 1,500 to 3,000).

CLASS SIZE. The use of large classes is, indeed, not general among these schools. Table 6 demonstrates that for the entire group about one-fifth of all classes taught have fewer than 10 students. In the smaller colleges studied, those with enrollments below 700, over 30 per cent of all classes have fewer than 10 students and only 8 per cent have more than 40.

It is evident that these colleges should pay much more attention to the factors which bring about the lower teacher-pupil ratio and should study the impact of this practice on the total institutional budget. Of course the problem is not simply a matter of adjusting some numbers in order to achieve a different level of efficiency. The utilization of faculty as well as plant grows out of the curriculum, the program, and the educational philosophy of an institution. There will always be colleges which place a high value on

TABLE 4 *Trends in the Total Number of Full-Time Faculty Employed in the Colleges of This Study, 1940-1959*

Size of Institution (1959-60)	No.	No. Full Time Fac. 1940-41	No. Full Time Fac. 1950-51	No. Full Time Fac. 1955-56	No. Full Time Fac. 1959-60	Per cent Increase 1940-59
1500-3000	17	901	1294	1348	1812	101
1000-1499	18	842	1165	1222	1416	68
700-999	13	434	567	630	735	69
400-699	23	522	741	751	824	58
Less than 400	11	178	234	251	293	65
TOTAL	82	2877	4001	4202	5080	77

TABLE 6 *Distribution of Class Size in the Colleges Participating in this Study, 1959-60.*

Size of Institution 1959-60	Class Size fewer than 10	10-19	20-29	30-39	40 or more
1500-3000	17.8%	24.6%	27.7%	16.6%	13.3%
1000-1499	16.0	27.2	27.9	15.9	13.0
700-999	20.5	29.7	26.6	13.5	9.7
400-699	30.5	30.0	17.9	13.1	8.5
Less than 400	35.3	28.2	17.6	11.6	7.3
Percentage, All Institutions	20.8	27.2	25.4	15.1	11.5

TABLE 5 *Average Number of Students Enrolled per Full-Time Faculty Member in the Colleges Participating in This Study, 1940-59.*

Size of Institution (1959-60)	1940-41	1950-51	1955-56	1959-60
1500-3000	15.9	16.3	17.4	17.6
1000-1499	14.3	14.2	14.2	15.6
700-999	12.3	14.2	12.8	15.2
400-699	14.3	13.3	12.9	14.9
Less than 400	11.3	10.4	11.5	12.1
Average, All Institutions	14.3	14.5	14.6	16.0

low pupil-teacher ratios and small classes. But these institutions should have a clear understanding of what these luxuries cost, who pays for them, and what they may have to do without as a result.

SALARIES. One important implication of the differences in student-faculty ratios may be seen from Table 7 which describes the average faculty salaries. This table shows average salaries to have moved from a high of nearly $2,600 in 1940 to a high of nearly $6,600 in 1959. It also discloses that in small institutions salaries have been generally lower than in large ones. Even the estimates of averages to be paid during the next 10 or 15 years retain the character of lower averages for the smaller colleges. Most striking is the relatively low level of the estimates for the years ahead, especially for 1970 and 1975, at which time the colleges anticipate paying average salaries of about $9-10 thousand. Most of the economic analyses of college faculty supply and demand indicate that salaries will have to double and perhaps triple in the next two decades. The estimates here, however, forecast no more than a 59 per cent increase between now and 1975. This discrepancy suggests that college administrators would be well advised to give much greater study to the matter of more realistic future salaries and to the implications of those levels for institutional budgets and financing.

D. Finances. Basic to any kind of institutional planning is an analysis of where the money comes from to pay for the plans being made. In such an analysis what must be known is:

A. What is the total income?
B. What proportions of it are derived from specific sources such as student fees, endowments, gifts, church, or other appropriations?
C. Are these proportions in line with those in comparable institutions?
D. Even though these proportions may be high enough, are the actual amounts available sufficient to provide operating capital and capital investments as well?
E. What is the economic level of the student clientele?
F. If it is a church college, what is the economic potential of the church constituency?
G. Has the alumni group been brought to a satisfactory level of contribution?
H. If the institution serves a metropolitan area, has this provided enough in terms of community contributions and students?
I. What will be the level of total expenditure in the future to provide for the program and faculty envisioned?

TABLE 7 *Trends in Average Faculty Salaries Paid in the Colleges Participating in This Study, 1940-59, with Anticipated Averages to 1975.*

Size of Institution (1959-60)	1940-41	1950-51	Per cent Increase Over 1940	1955-56	Per cent Increase Over 1950	1959-60	Per cent Increase Over 1955	1965-66	1970-71	Per cent Increase Over 1959	1975-76	Per cent Increase Over 1959
1500-3000	$2383	$3933	65	$5071	29	$6301	24	$7467	$9500	51	$10,000	59
1000-1499	2565	3910	52	4956	27	6590	33	7500	8325	26	9,188	39
700-999	1993	3350	68	4424	32	5811	31	6960	8200	41	8,992	55
400-699	2266	3261	44	4088	25	5438	33	6289	7222	33	8,175	50
Less than 400	1915	3221	68	4158	29	5002	20	6760	7218	44	7,500	50

THE FINANCIAL PICTURE IN THE COLLEGES OF THIS STUDY. In general, the institutions reported upon here derive about 40 per cent of their income from student tuition, a figure comparable to most other colleges. As will be seen in Table 8, there appears to be no significant difference between the smaller and larger schools on this score.

TABLE 8 *Percentage of Income Derived from Tuition and Other Sources In the Reporting Colleges, Fall 1959.*

Size of Institution	Per cent from Tuition	Per cent from Endowment	Per cent from All Other Sources
1500-3000	40.1	3.5	56.4
1000-1499	41.8	10.6	47.6
700-999	43.3	5.9	50.8
400-699	42.2	7.6	50.2
Less than 400	43.2	12.7	44.1

This table, however, does not reveal the difference that does exist – with but a few exceptions– with respect to the average amount of tuition charged per student according to the size of the college. An analysis of the average amount of income per student derived from tuition shows that it was higher in those institutions with larger enrollments. In the smaller schools, average tuition was about $400 per student; in the larger, private ones it was about $650.

This is an area of concern, particularly for the smaller colleges whose average faculty salaries have generally lagged behind the larger colleges. If they derive approximately the same proportion of their income from tuition and the average amount of tuition per student enrolled is several hundred dollars less than in the larger colleges, it is evident, unless there are other substantial sources of funds, that the consequences must manifest themselves in a lesser amount available for teacher salaries. Add to this the information revealed by Tables 5 and 6 regarding class size, and the effect certainly must result in a limitation of funds for instructional purposes. The remedy for this dilemma will lie, of course, with the individual institution which must decide whether to depend more heavily upon tuition income, or to depend upon other sources of gift support.

PART II. Physical Characteristics

A. The Campus Plan. Anyone familiar with our colleges and universities is aware of the tremendous variations to be found in the characteristics of different campuses. Some reflect careful planning in the location of buildings, architecture, and land use. Others seem to have developed with little or no planning beyond the immediate response to the needs of the period in which the individual units on the campus were built. This is attested to by the fact that on many campuses it is possible to find two, three, and sometimes four different "master plans" which have been prepared at one time or another. Changing administrative points of view, changes in architectural emphasis, and responses to the pressures of specific situations, have resulted in deviations from these plans. (In general, the more rigid the master plan, the sooner circumstances dictate its being rejected.) The result is that on many of these campuses a master plan might just as well never have existed. What they have, rather, might be called a "random building location" plan – the result of some accidental moment in the plant expansion program of the college.

One of many such "plans" is shown in Figure 2. Here the location of buildings gives practically no evidence of the integral relationships among the various types of buildings. One example is the library, located so that it is relatively isolated from

the main learning activity of the campus and at an excessive distance from the men's dormitories. Another is the long distance between the men's and women's residences, the disadvantage here being that the provision of co-educational dining facilities would create an inconvenience for one group or the other.

It is true that in recent years there has been greater concern with the integral relationships between the instructional program and the location of buildings. Of course, in most institutions which have been in existence for decades, it would be difficult if not entirely impossible to re-create the entire campus arrangement in accordance with all the principles of facilities interrelationships. But in those situations where there has been an awareness of these principles, and planners have not been too bound by their traditions and preconceived notions, it has been possible to develop fairly rational plans consistent with the limitations imposed by existing campus arrangements.

A good campus plan is that shown in Figure 3 in which the dormitories, the student union, and the dining hall are located in an area slightly displaced from the central campus. In another separated area are concentrated the instructional facilities, including the library, which is located central to the classroom buildings. The core of athletic and physical education facilities are in still another section. Also, the auditorium with space for music instruction is located at one edge of the central campus, thus providing for a minimum of noise interference with other classrooms. The plan also recognizes the inevitable: namely, that service to commuting students and the adult community, as well as resident students, will involve the ownership of automobiles for which space must be provided.

As for the colleges in this study, a majority reported that they did have a campus plan. While there is wide variation in the character of these plans, for the most part they appear to be relatively limited in scope and consist primarily of informal sketches of the campus or some portion of it, with little or no basis in a thorough institutional study.

This, then, is an area of planning to which the colleges should turn their attention if they are to provide a physical setup appropriate to the instructional program.

B. Size of Campus. Data on the number of acres devoted to campus sites in the colleges reporting on this question, indicate that the average size of a campus in colleges with enrollments of less than 3,000 is about 100 acres. (See Table 9.) According to this table, there is apparently little difference on this score between public and private institutions. (In both public and private colleges the range is from less than 10 acres to over 400 acres. In the private institutions, almost one-half of the campuses ranged in size from 30 to 50 acres.)

There is considerable difference, however, between the public and private colleges with respect to the average number of acres provided per student. The private schools have about .10 acres per student as compared to the publicly supported colleges, which average about .06 acres per student.

Not only do the campuses of these institutions vary in size, but they vary greatly in the degree to which they can be expanded to meet future needs by purchase of adjacent lands. The colleges were asked to indicate whether land adjacent to the campus was residential, commercial, or undeveloped

TABLE 9 *Size of Campus by Types of Control, 1959-60.*

Type of Control	No. of Institutions	Total Enrollment#	Total Acres	Aver. No. of Acres per Student	Aver. No. Acres per Institution
Public	12	21,000	1243	.06	104
Private	6	6,000	617	.10	103
Church Related	21	18,000	2189	.12	104
Church Controlled	23	16,500	2218	.13	96

#Rounded off

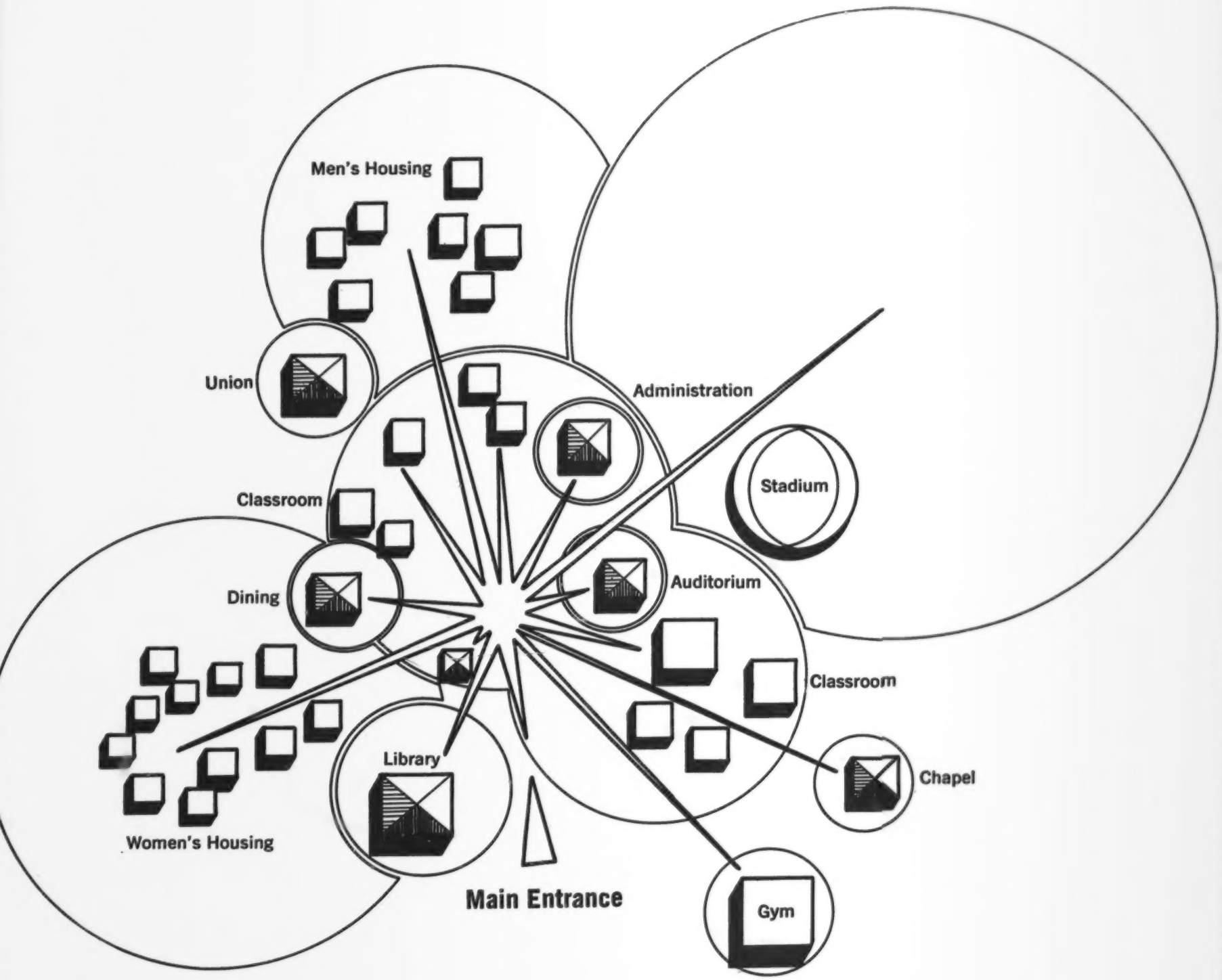


Figure 2

Buildings strewn in random locations on campus, as shown here, perform isolated services, may compete with each other, fail to integrate total functions of an institution.

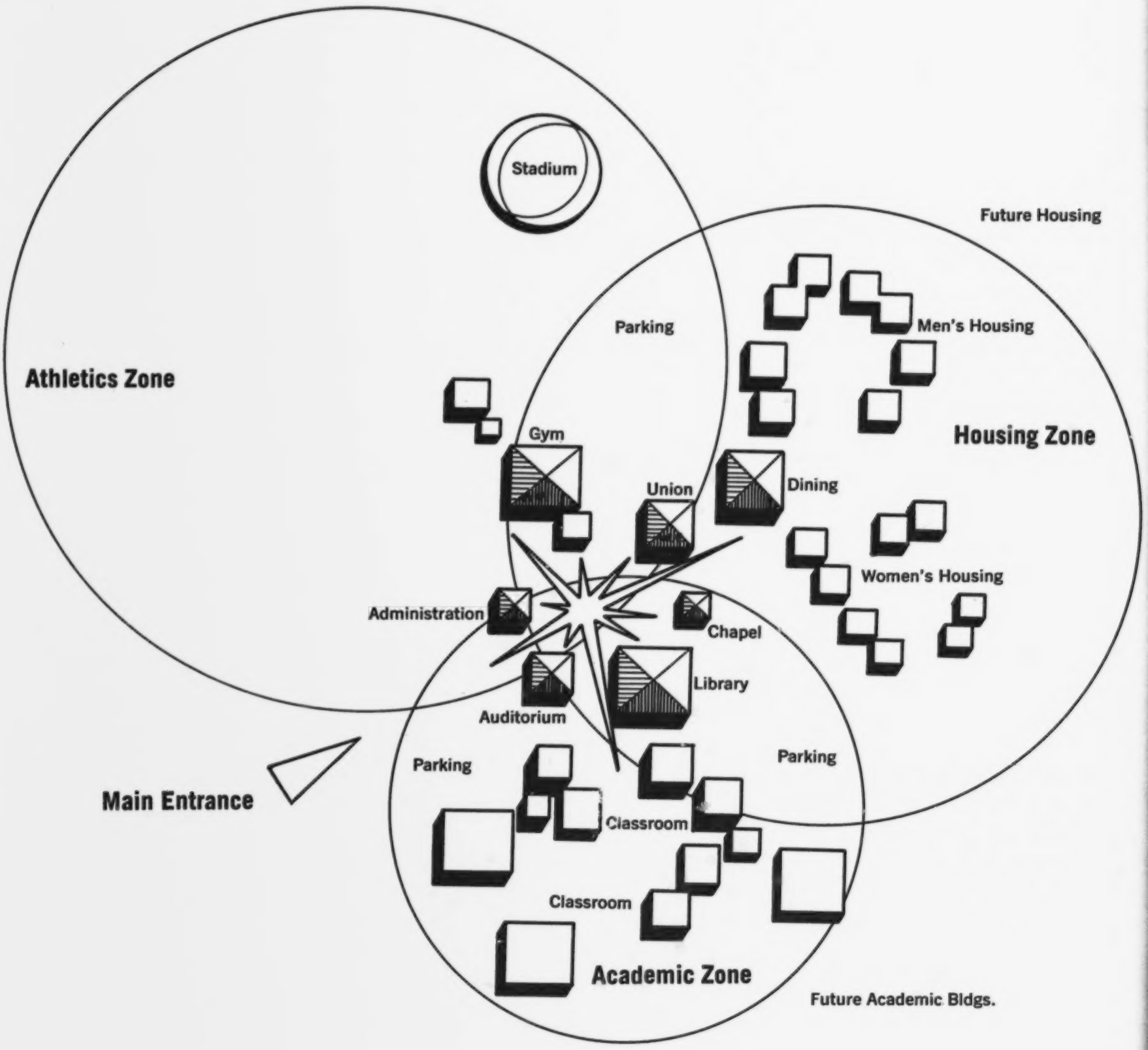


Figure 3

A well planned campus. Buildings are "zoned" according to function.

and readily available; residential or commercial but difficult to obtain — or whether no land was available at all. Slightly over half of the colleges replied that they were located in a situation which made additional land difficult or impossible to acquire.

Many colleges with campuses of from 30 to 50 acres — with a certain number of buildings already occupying these sites — are going to run into problems regarding the location and placement of new buildings. In many cases the multistory building, perhaps located in the only space left, will have to be resorted to even though ideally other arrangements might be more desirable.

C. Age and Size of Buildings. A factor of vital importance in figuring out the need for future instructional facilities is the adequacy of existing buildings and classrooms.

Age alone does not present a clear picture of the adequacy or inadequacy of a structure since subsequent remodeling can often prolong the life of a classroom building by many years. Neither can any arbitrary age date be set at which a building becomes obsolete since all buildings do not age at the same rate. But age can serve as an index of expected obsolescence, and as a factor in the determination of future needs.

The colleges providing data were asked to indicate the date of construction of each of the buildings being used entirely or partially for instructional purposes. Table 10 presents a summary of the responses, showing the dates of construction of the buildings by certain periods, the number of buildings still in use, the number of classrooms and laboratories in these buildings, the total number of square feet devoted to classrooms and labs, and the average number of square feet per room.

According to the table, about 40 per cent of the buildings still in use were built prior to 1920, and about 20 per cent of them have been built during the past 10 years. Of the 2,252 classrooms reported by these colleges, about 49 per cent of them are in buildings constructed before 1920. Of the total square feet devoted to classrooms and laboratories, about 47 per cent are in buildings erected prior to 1920.

Size. Two additional items shown in Table 10 are of some interest, though they must be considered in light of the fact that a number of the buildings have been changed by extensive remodeling since their original construction. The first is that on the average, there are about 9 classrooms and laboratories per building in this group of colleges. How-

TABLE 10 *Number of Buildings by Date of Construction (Buildings Entirely or Partially Used for Instruction).*

Date of Construction	Number of Buildings	Number of Classrooms	Number of Laboratories	Average No. of Classrooms & Labs per Bldg.	Tot. No. of Sq. Ft. in Bldgs.	Tot. Sq. Ft. in Classrooms & Labs.	Average Sq. Ft. per Room
Before 1870	10	72	30	10.2	104,734	47,669	467
1870-1899	55	370	170	9.8	572,221	346,659	642
1900-1919	96	671	377	10.9	1,911,587	1,045,517	998
1920-1929	55	333	263	10.9	921,752	468,749	786
1930-1939	32	242	135	11.8	780,058	282,155	748
1940-1949	70	277	206	6.9	1,707,198	365,170	756
1950-1959	77	287	200	6.3	1,450,182	505,346	1038
TOTAL	395	2252	1381	9.2	7,447,732	3,061,265	843

ever, during the last three decades there has been a decrease in the number of classrooms per building from almost 12 to just a little more than 6. This fact is accounted for by the general increase during the same period of time, in the average size of the classrooms and laboratories built. The latter point is of particular importance in that it reflects the apparent recognition of the utility of and need for larger classroom facilities to accommodate the larger average class size which has developed with increasing enrollments. This fact is also substantiated by historical data on the number of students per full-time-equivalent faculty, as related earlier in this chapter.

The second item has to do with the financial implications of the age of buildings. These implications become clear when the square footage involved is translated into dollars. Table 10 shows that about 47 per cent of the square feet in classrooms and laboratories is more than 40 years old. This comes to about 2.5 million square feet of building space, much of which will have to be either replaced or remodeled during the next 10 or 20 years. At an average cost of $25 per square foot, this would mean a total capital outlay for replacement of $62,500,000. Even if only one-half of the space is to be replaced, this would mean an outlay of over $30 million, plus whatever would have to be spent for refurbishing the remainder. The cost of replacement and remodeling, plus the cost of new facilities to meet the increased enrollments, will more than offset any savings which may be made by a higher level of space utilization. Increasing the level of instructional space utilization, important as that is, will not solve the total problem of facilities needs.

D. Planned Construction. As part of this study, participating institutions were asked to report on the planned construction of new instructional facilities on their respective campuses. The replies are summarized in Table 11.

According to this table, the 62 colleges reporting have planned to spend a total of over $95 million for the construction of new facilities or the renovation of present ones. This is an average of about $1.5 million per college. For these colleges as a group, this would be 103 new buildings and 35 instances of additions or renovations. This would provide 792 new classrooms and 697 new laboratories, or a total of 1,489 new instructional rooms in these 62 institutions. In the study of the utilization of instructional facilities (reported in the next chapter) it was found that colleges of this type are averaging approximately 25 students per room on their campuses, if the classrooms and laboratories are combined in the computation. Assuming this same average, the 1,489 new rooms planned for construction by these colleges would provide for slightly over 37,000 new

TABLE 11 *Planned Construction of New Instructional Facilities Reported by Colleges in This Study*

Size of Institution (1959-60)	No. of Colleges Reporting	Total Anticipated Capital Outlay	No. of New Bldgs.	No. of Addit. Renov.	No. of Add. Classrooms	No. of Add. Laboratories	No. of New Stu. Prov. @ 25 Stu. per Rm.	Aver. Amt. per College
1500-3000	13	$34,418,730	24	8	261	296	13,925	$2,647,595
1000-1499	13	25,615,000	25	8	100	128	5,700	1,970,385
700-999	10	12,478,000	17	5	130	103	5,825	1,247,800
400-699	16	14,855,000	27	9	223	127	8,750	928,438
Less than 400	10	8,379,400	10	5	78	43	3,025	837,940
TOTAL	**62**	**$95,746,130**	**103**	**35**	**792**	**697**	**37,225**	**$1,544,292**

The 62 colleges covered in this table had a total enrollment in 1959 of 58,000. These are not the same 62 institutions reported upon in Table 9, where total enrollment was 62,000. The reader is reminded that the number and identity of reporting institutions may vary from one table to another.

students. This is an increase of 64 per cent over their enrollments of 58,000 in the fall of 1959.

Now, it will be recalled that though a number of colleges stated they have not set any upper limits, the average future level of enrollments anticipated in the next decade or so comes to about double the present level. This means that in the next 10 or 15 years these colleges will reach an enrollment of about 120,000 compared to their present 58,000. But their present building plans will provide space for only 37,000, leaving over 25,000 new students unprovided for. In the case of the 62 colleges under consideration here, an increase in the present level of utilization from 22 per cent (see Table 19) to 35 per cent would provide space for an additional 29,000 students. (Though this would be more than a 50 per cent increase in utilization, it is not so improbable an expectation as might appear. It means that student stations would have to be occupied 15 hours in a 44 hour week instead of the present 9.5 hours.) This, combined with the provision of new or renovated space for 37,000, would meet the anticipated doubling of enrollments.

However, this still does not take care of two very important items: One, the replacement of those facilities which will become obsolete during the next 20 years; and two, the replacement of those facilities which must be judged inadequate now. Specific data on either one of these items are, of course, not readily brought together. The rate of obsolescence will depend largely upon the level of maintenance and extent of renovation undertaken. Also, the proportion of facilities which might be judged inadequate varies greatly from one college to another. The data of this study, including visits to numerous campuses, would tend to indicate that from one-fourth to one-third of present instructional space could be judged as inadequate. At the very minimum, then, it would seem that about one-half of the improved level of utilization would be counterbalanced by obsolescence and the need for replacing existing but inadequate facilities. One must conclude on this basis that the many colleges represented by this sampling will have to seek out and provide financial resources for even more instructional facilities than they are anticipating at present.

In fact, when the need for other types of instructional facilities, particularly libraries, is taken into account it becomes clear that the present amount of anticipated capital outlay represents an even smaller proportion of the total funds that will be required. For example, of 78 colleges in this study that responded to the question, "Are there current plans to expand library facilities?" only 33 said there were not, while 45 indicated one or more types of expansion being planned. In 15 of the colleges, there were plans for an entirely new facility; in 13, plans for additions to present buildings; in 18 instances, plans to supply additional space in the present building; and in 8 colleges special efforts are contemplated to increase the present holdings of volumes.

The question that must inevitably follow is how all of this will be financed. Here are the answers:

Of the state-controlled institutions in the sampling only one claimed that it was going to depend upon private gifts. The remainder will depend upon direct appropriations of state funds for the building of instructional facilities.

Of the private colleges, 45 professed they were dependent upon specific private gifts for the buildings; 25 will look directly to their supporting churches for major financing; 15 will resort to fund drives and other similar sources. Only 2 of the colleges propose to use some of their endowment funds, while 2 others intend to increase student fees to provide additional financial sources for construction.

3

UTILIZATION OF INSTRUCTIONAL SPACE

If a study were to be made of the utilization of all types of physical facilities on college and university campuses, the complexity of the problem would pose a formidable barrier to successful effort. The fact that this project focused attention on the instructional facilities is not to be interpreted as implying that other types of space, particularly library, research, and office space, are not in need of study.

For two reasons, namely the convenience of studying a portion of a larger problem, and the fact that instructional space in our colleges and universities does account for approximately half of the capital outlay, the present study was limited to the use and planning of instructional facilities only. Further justification for this emphasis is that in the small colleges, which were the main focus of this study, the proportion of capital outlay for instructional facilities is certain to be more than half of the total expenditures for new buildings and renovations.

Measures of Available Space and Utilization. The basic definitions and classifications of space, as well as the general techniques and measures of utilization used in this study are those presented in the Russell-Doi *Manual for Studies of Space Utilization in Colleges and Universities.* (Several new measures for the extent of space are introduced here as well.) For the purposes of this study, the techniques were adapted for IBM processing. A complete description of the procedures followed is appended at the end of this chapter.

The extent of available space for instructional purposes can be expressed in terms of A. the number of rooms used, B. the number of student stations reported in such rooms, C. the total number of square feet of assignable space in these rooms, D. the number of square feet per student station, E. the number of square feet per full-time student enrolled, and F. the number of square feet of space per 100 hours of occupancy. The first five of these measures are readily understood since they represent either a straightforward measurement of sum or a ratio of such sums.

Perhaps a word is in order regarding the measure "square feet per 100 hours of occupancy." Because this involves a measure of the hours of occupancy, it represents the intensity of use made of the space. For example, if a room has 600 square feet of assignable space in it, and there are an average of 500 student station occupancies during the week, then this 600 square feet is divided by the 500 student station occupancies. The result, 1.20, multiplied by 100 hours of occupancy, yields 120 square feet for those hours of occupancy. If another room with 800 square feet of space shows 500 student station oc-

cupancies, then that room would have 800/500 x 100 or 160 square feet per 100 hours of occupancy.

It should be pointed out that even though this measure does differentiate use of rooms on the basis of the intensity of use, this is done in terms of square feet of space, and therefore there is still need for measures of room-period utilization and student-station utilization on the basis of some uniform standard of time.

Perhaps the simplest measures of use are the average number of room periods that a room is occupied during a week, and the average number of student hours of use per week per student station. It is clear, however, that unless these numbers are related to some measure of possible use they are not very meaningful.

One basis of relationship is the percentage of possible utilization in terms of the length of the individual college's weekly schedule. This would not help, however, if one wanted to compare the utilization figures of several institutions, since weekly schedules vary from one college to another. It is most useful, therefore, to express the percentage of possible utilization of room periods and student stations in terms of some standard for all of them, such as a 44-hour week. Using this figure does not imply that this is the optimum week for colleges and universities. It simply provides a convenient reference base.

Now, even when the utilization data of an institution are expressed in terms of percentage of possible use on the basis of a 44-hour week, there is still question as to where a given level of utilization places a college in comparison to others. For this purpose, tables of norms have been prepared.

A. Extent of Space Provided. Table 12 presents data summarizing the extent of space provided in general classrooms and laboratories, as well as full-time enrollment in the 53 institutions reporting on these questions.

It will be noted that the enrollments here came to over 40,000 students in 1958. As indicated in the introduction to this report, the average dollar value of instructional facilities per student is in the neighborhood of $1,455. Under discussion here, then, is a level of utilization involving investments of some $60 million. To carry the dollar meaning further, if there are plans to increase the extent of these existing facilities by 50 per cent during the next decade, this would mean an investment of $30 million. But if the level of utilization of existing space could be increased by 50 per cent, this could mean a savings for these colleges of $15 million in capital outlay over the same period. Even half of this, a 25 per cent

TABLE 12 *Space in General Classrooms and Instructional Laboratories: Fall Term 1958*

Type	Full-Time* Enrollment (1958)	Reported Number of Rooms	Number of Student Stations Reported	Total Sq. Ft. Reported Assignable for use	Sq. Ft. per Student Station	Sq. Ft. per 100 Hours of Occupancy	Sq. Ft. per Full-Time Student Enrolled
General Classrooms	42,852	1,203	50,649	818,351	16.2	169.6	19.1
Instructional Laboratories	42,852	468	12,436	405,746	32.6	452.0	9.5

*Based upon 53 reporting institutions.

increase, which would only require that student station occupancies be increased from the present average 9.5 hours to 12.3 hours in a 44 hour week, would save some $7.5 million. Put this way it becomes easy to see the importance that attaches to a careful analysis of space and the intensity of its use.

For convenience of interpretation, the data of Table 12 on the square feet per full-time student enrolled and the number of square feet per 100 hours of occupancy have been translated into percentiles. These are Tables 13 and 14. They merit careful examination.

The variation in the extent of space provisions in classrooms and laboratories is clearly shown in these two tables.

First, it is evident from Table 13 that, on the average, most colleges provide about three times the amount of square feet of general classroom area as laboratory area for each full-time student enrolled. Table 12 provides further substantiation for this in that the average number of classrooms provided per 100 students was about three, while the number of labs per 100 students was about one.

These ratios of the number of classrooms to labs, and the total number of square feet in each, are presented here as being of considerable importance in facilities planning for this reason. As one looks into the instructional programs of these liberal arts institutions, it is fairly common to find the ratio of student-credit-hour production in science to be only about one-sixth of the total. *The point, of course, is that the colleges have spent capital outlay funds at about a one-to-three ratio for labs, while their instructional programs show science to be in a ratio of one-to-six.* Since future construction plans are based on the present ratios of labs to classrooms, by the end of the next decade the present excess will be increased further. If building plans are realized, at the end of ten years the colleges will have four times more laboratory space than is actually required by their instructional programs. This will be discussed again later, when the implications of all these data are combined. Suffice it to say at this point, however, that the construction of less specialized, more flexible laboratories should be given considerable thought in building plans about to be undertaken.

The data of Table 13 raise another question. This has to do with the wide spread in the figures of square feet per full-time student enrolled. The average number of square feet per student enrolled in general classrooms varies from a low of 6.7 to a high of 60.5. The average provision is about 20 square feet. This range is too broad and indicates something must be out of line. Assuming for the moment that these spaces are of equal adequacy (an unrealistic assumption, actually) one can only conclude that the lack of greater similarity in these space provisions must have cost some institutions unnecessary capital outlay funds, or else, if their utilization turns out to be low, they are in a position to enroll many more students than they have. In either case, dollar savings are implied.

TABLE 13 *Percentile Ranking of Square Feet per Full-Time Student Enrolled.*

Percentile Rank	General Classrooms	Teaching Laboratories
99	60.5	28.3
90	35.1	16.1
80	29.4	13.8
70	25.8	12.5
60	21.7	10.3
50	19.5	9.4
40	16.8	7.4
30	15.5	7.0
20	13.1	5.9
10	12.0	4.2
01	6.7	1.7

TABLE 14 *Percentile Ranking of Square Feet per 100 Hours of Occupancy.*

Percentile Rank	General Classrooms	Teaching Laboratories
99	406.2	921.3
90	296.7	781.9
80	251.9	623.6
70	223.0	585.9
60	193.9	519.9
50	168.0	475.8
40	156.9	397.4
30	143.8	339.9
20	128.5	298.6
10	112.2	269.0
01	97.1	143.2

Table 14, which shows the percentile rankings of "square feet per 100 hours of occupancy," reflects the intensity with which available space is being used. That is, this is an intensity measure without regard to room periods or student stations, but only with the hours of occupancy taken into account. Here again, there are extremely wide variations in both the general classrooms and the teaching laboratories. First, as might be expected, since laboratories are used a good deal less than classrooms, and the number of square feet per student in labs is larger than in classrooms, there are about twice as many square feet per 100 hours of occupancy in laboratories as in general classrooms.

Second, one may raise essentially the same question that is raised about Table 13, namely, what is the reason for the wide variation in square feet for either the classrooms or the laboratories? Is it not evident again that the institutions in the upper half of the percentile distribution could readily accommodate quite a few more students without any additions to facilities?

The one case where provisions of space are fairly uniform is in the number of square feet per student station in the general classrooms. The average for the group of colleges is slightly over 16 square feet. For the laboratories, the average for the group is slightly over 32 square feet per student station, but the variation among institutions was again fairly noticeable. And, with laboratory space and equipment as expensive as it is, this appears to be another area in which careful study is needed as a college plans for new facilities.

B. Room-Period Utilization. Room-period utilization of instructional facilities is a measure of the efficiency with which instructional space is used, as indicated by the average number of periods that rooms are used weekly, and the percentage this represents in respect to some uniform base such as a 44-hour week. Specifically, room-period use is expressed in terms of the number of hours a week that a single room is occupied by classes, or the average number of hours that a group of rooms is used per week. These figures are then translated into a percentage of possible utilization on the basis of a 44-hour week. It should be kept in mind that a room is considered to be in use if it is occupied by a scheduled class, regardless of the number of students in that class.

An illustration may clarify the meaning of this measure. If a college has 30 classrooms and schedules class meetings in these rooms for a total of 660 hours per week, the average room-period use would be 22; that is, 660 divided by 30. On the basis of a 44-hour week, this would be a 50 per cent utilization —that is, 22 actual periods of use divided by 44 hours.

Table 15 presents data on room-period utilization in the group of colleges reporting on this. *The average room-period utilization for general classrooms is 17.6 per week and for laboratories it is 10.8 per week. The percentage of possible room-period utilization on the basis of a 44-hour week, for general classrooms is 40, while for laboratories it is 25.*

Here, again, in the area of room-period use, the question must be raised as to the reasons for the wide variations among the institutions. Table 16, which presents percentile ranks for the levels of use, shows a broad variation in the percentage of possible room-period utilization of general classrooms. This utilization ranges from a low of 21 per cent to a

TABLE 15 *Room-Period Utilization for General Classrooms and Instructional Laboratories*

Type	Number of Rooms Reported	Average Number of Periods of Use per Room per Week	Percentage of Possible Room Utilization on 44-Hour Weekly Basis
General Classrooms	1,203	**17.6**	**40**
Instructional Laboratories	468	**10.8**	**25**

high of 61 per cent and, for the laboratories, from a low of 10 per cent to a high of 44 per cent. Thus, the highest percentage of use of laboratories actually is equal to classroom use at the 80th percentile. (There is often, however, a good deal of unscheduled, but educationally valuable use of laboratories which does not show in statistical studies of this kind.)

Because of the way in which the measure is defined, it is not possible to talk in terms of how many additional students could be accommodated if the room-period utilization were increased in a given college, but it is possible to make some judgments regarding the number of additional classes which could be taught. And of course this factor does have a direct bearing on the number of students who might be accommodated. One conclusion can be drawn, however:

If 30 per cent of the colleges can utilize their rooms at least at a 43 per cent level, then the colleges in the lower 50 per cent group certainly need to study their program and utilization carefully before embarking upon the building of new instructional facilities.

Closely related to the room-period utilization of classrooms and laboratories over a period of an entire week, is the level of utilization of these facilities by each day of the week. That is, where the percentage of possible use of room-periods was 40 for classrooms and 25 for laboratories, what variations can be found in the utilization of these facilities by days of the week? Table 17 summarizes these data.

It shows that among the entire group of institutions, general classrooms are used most on Mondays, Wednesdays, and Fridays, in that order, with the minimum use occurring on Tuesday. About 30 of the reporting colleges showed utilization of classrooms on Saturday mornings, and several of them were at a fairly high level. For laboratories, the maximum days of use are Tuesday and Thursday, with only 11 of the colleges using laboratory facilities on Saturday mornings, and at that not to any great extent.

Another factor of some importance in the utilization of instructional facilities is their use by hours of the day. Table 18 summarizes this. The distribution of the percentages in these tables again reveals the results of the rather traditional procedure of scheduling classes in the morning and laboratories in the afternoon. This unevenness of class schedules can be an important deterrent to achieving optimum utilization of instructional facilities.

TABLE 16 *Percentile Ranking of Room-Period Utilization Scores*

	General Classrooms		Teaching Laboratories	
Percentile	Average No. of Periods per Week per room	Percentage of Possible Utilization of a 44-Hour Week	Average No. of Periods per Week per Room	Percentage of Possible Utilization of a 44-Hour Week
99	26.8	61	19.3	44
90	22.5	51	14.5	33
80	20.0	45	13.0	30
70	18.8	43	12.2	28
60	17.7	40	11.3	26
50	16.9	38	10.5	24
40	16.3	37	10.1	23
30	15.4	35	9.7	22
20	14.3	33	8.8	20
10	12.8	29	7.7	18
01	9.3	21	4.3	10

C. Student-Station Utilization. After an analysis has been made of the intensity of use and the level of room-period utilization, another important measure is the degree to which the student stations are utilized, regardless of room-period utilization. This measure yields information as to how many students can be accommodated.

How this is computed can best be illustrated by an example. Suppose that a room with 35 student stations shows a total of 846 student-station occupancies during a typical week. Dividing 846 by 35

TABLE 17 *Percentage of Possible Room-Period Utilization of General Classrooms and Instructional Laboratories by Days of the Week, Fall 1958, Based on 44-Hour Week*

Type	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday A.M.
General Classrooms	47.2	35.9	45.4	36.6	44.0	11.4
Instructional Laboratories	26.1	30.8	25.5	29.5	19.4	2.3

TABLE 18 *Percentage of Room-Period Occupancy of General Classrooms and Instructional Laboratories by Hours of the Day Based on Six Days a Week for A.M. Hours and Five Days a Week for P.M. Hours, Fall 1958*

Type	7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11
General Classrooms	17.2	41.8	45.4	34.5	42.6	20.6	43.4	39.5	24.4	9.2	7.1	7.9	6.0	5.6	6.8	0.8
Instructional Laboratories	9.5	19.4	23.2	21.4	28.3	10.2	28.0	35.7	26.5	14.0	7.7	8.3	5.4	4.9	7.8	4.0

would yield 24.2 student-station occupancies per student station in that room. On the basis of a 44-hour week, this would represent 55 per cent of possible utilization (dividing 24.2 by 44 and multiplying by 100). Now, suppose that a room was in actual use for a total of 45 periods during the week. If every seat were occupied during those 45 room periods, there would be a total possible 1,575 student-station occupancies. Since 846 occupancies actually occurred, this would mean that on the average 54 per cent of the student stations were occupied when the room was actually in use.

Table 19 presents data on the student-station utilization in general classrooms and in instructional laboratories. *In the general classrooms, on the average, a student station is occupied 9.5 hours per week, which represents 22 per cent of possible utilization in a 44-hour week. When the rooms are actually occupied, the average percentage of student-station use for the entire group of colleges is 51. For the instructional laboratories, the average number of hours of occupancy is 6.7 while the percentage of possible utilization on the basis of a 44-hour week is 15. When the labs are actually in use, 57 per cent of the student stations are used.*

The variation in the utilization of student stations is best illustrated by Tables 20 and 21 which are percentile distributions. The percentage of possible utilization of student stations in classrooms varies from a low of 10 per cent to a high of 39 per cent. A similar variation occurs for the instructional laboratories.

Tables 22 and 23 are presented in order to show the level of utilization of student stations by days of the week and hours of the day. One point to note here is that on any of the five days, the averages of

use of general classrooms run above 25 per cent; and three of the days – Monday, Wednesday, and Friday – actually have percentages above 35. It is actually the low utilization on Saturday that brings the total percentage down to 22 for classrooms. A similar observation may be made regarding instructional laboratories. Several of the reporting colleges had utilization percentages of up to 45 and 50 on certain days for general classrooms, and up to 30 and 35 per cent for laboratories.

TABLE 19
Student-Station Utilization in General Classrooms and Instructional Laboratories, Fall Term 1958

Type	Number of Student Stations Reported	Av. Student Hours of Use per Station per Week	Percentage of Possible Student Station Use on 44-Hr. Wkly Basis	Percentage of Station Use When Room is Actually in Use
General Classrooms	50,649	9.5	22	51
Instructional Laboratories	12,312	6.7	15	57

TABLE 20 *Percentile Ranking of Student-Station Utilization Scores*

	General Classrooms		Teaching Laboratories	
Percentile Rank	Average No. of Student Hours of Use per Week per Station	Percentage of Possible Utilization on a 44-Hr. Wkly Basis	Average No. of Student Hours of Use per Week per Station	Percentage of Possible Utilization on a 44-Hr. Wkly Basis
99	17.0	39	21.9	50
90	12.3	28	11.1	25
80	11.0	25	9.4	21
70	10.3	23	8.4	19
60	9.6	22	7.4	17
50	9.1	21	6.8	15
40	8.6	20	6.2	14
30	8.1	18	5.5	13
20	7.0	16	4.3	10
10	6.0	14	3.7	8
01	4.4	10	2.6	6

TABLE 21 *Percentile Ranking of Scores for "Percentage of Student-Stations Used When Rooms Are Actually in Use"*

Percentile Rank	General Classrooms	Laboratories
99	63.4	91.7
90	59.6	75.7
80	58.1	71.3
70	57.0	62.1
60	54.4	56.9
50	52.0	54.2
40	50.7	52.3
30	47.6	49.4
20	44.5	45.1
10	41.6	39.7
01	30.3	25.6

TABLE 22 *Percentage of Possible Student-Station-Period Utilization of General Classrooms and Instructional Laboratories by Days of the Week, Fall, 1958, Based on 44-Hour Week*

Type	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday A.M.
General Classrooms	37.8	26.8	36.5	27.9	36.2	6.3
Instructional Laboratories	15.5	20.1	14.7	20.2	11.8	1.2

TABLE 23 *Percentage of Possible Student-Station-Period Occupancy by Hours of the Day in General Classrooms and Instructional Laboratories Based on Six Days a Week for A.M. Hours and Five Days a Week for P.M. Hours, Fall 1958*

Type	7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10
General Classrooms	9.4	24.4	25.6	18.4	23.7	11.8	23.7	20.6	12.3	4.5	3.5	3.5	3.0	2.6	3.7
Instructional Laboratories	6.6	13.1	14.6	15.8	12.7	6.4	17.1	21.6	15.6	8.7	4.2	5.9	8.5	3.1	5.2

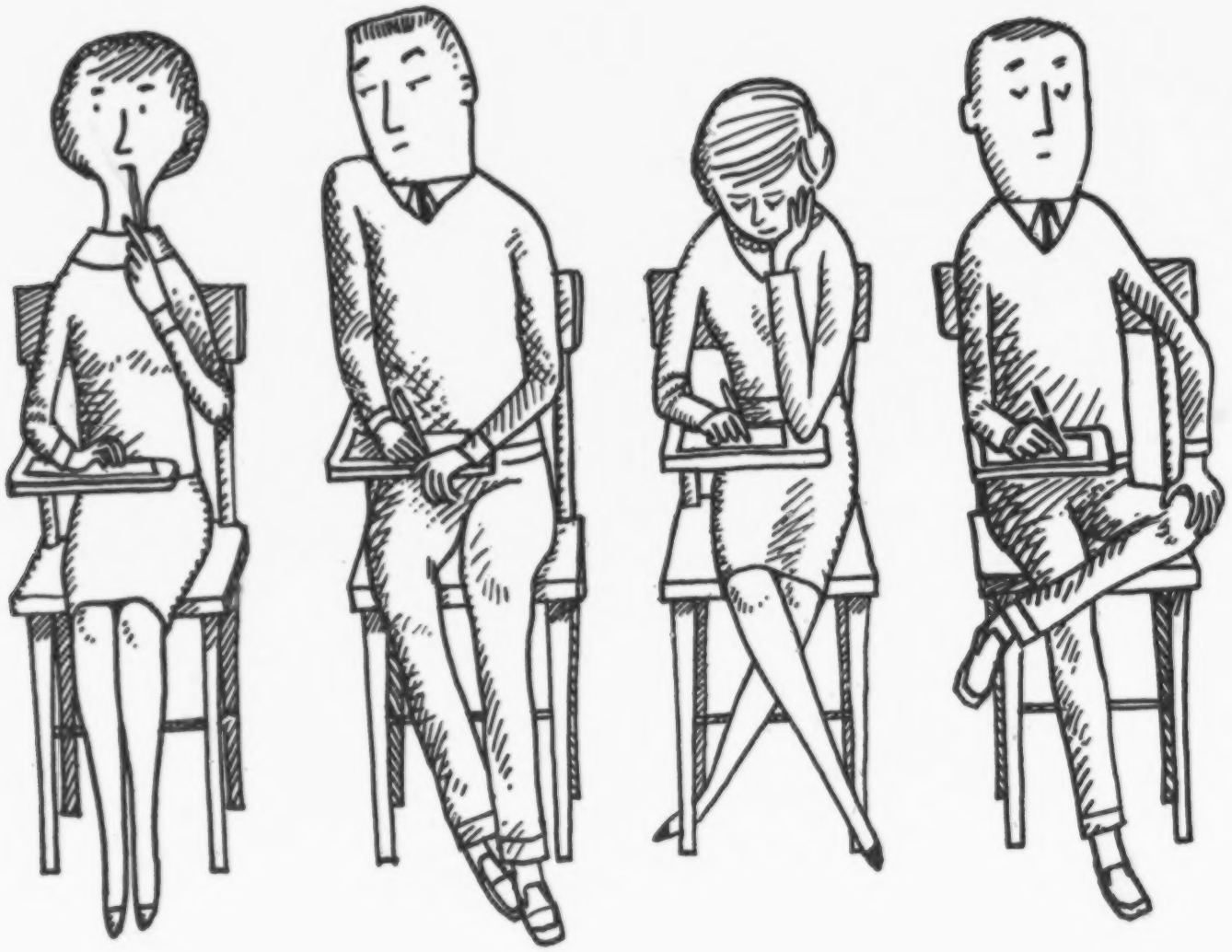
NOTE: The procedures used in the collection and analyses of the data presented in this chapter were as follows:

Each institution submitted data listing each room used for instruction, the size of the room, and the number of square feet of space in the room. On another set of forms, the colleges submitted their entire class schedules for the 1958 fall term showing the class, number of students enrolled, room in which scheduled, and the hour and days of meeting of the class. The next step involved the summarization of this information onto a single form for each of the rooms used, showing the hours of the day it was used and by how many students. From this form the information was transferred onto work sheets to be used by IBM card punchers. Each of the colleges for which data were used was given a code number.

The original IBM data cards were of two types. One card was punched for each room for which classes were reported. This was the college-building-room card. On this card was recorded the following information: institution code number, fall enrollment, code number of the building, room number, number of student stations in the room, the number of square feet of assignable space in the room, whether this was a general classroom or a laboratory, the number of room periods of use per week for the room, and the number of student station occupancies for the room per week.

The other card included the following data: the institutional code number, building code number, room number, and the number of students in the room on each day of the week at a given hour of the day. This type of card was made out for every hour of the day in which the room was in use. This was called the hour card. Thus, there was a card for every room and for every hour of the day that the room was in use.

IMPROVING UTILIZATION 4



The improvement of utilization is not an end in itself. It is simply a means of achieving more efficient use of the educational plant so that money can be saved. Because utilization is more than a matter of arithmetic, there is no single recipe for improvement which will apply to each and every college. Our institutions of higher education vary in their purposes, curricula, and character. That, in fact, is why their levels of utilization vary. These differences must be respected. At the same time, however, there are certain generalizations which can be drawn from the data in this report that will apply to all of them.

Here, then, is what the statistics in this book are all about.

Considered from almost any point of view, utilization of classroom and laboratory space in the colleges covered by this study is low. Classrooms are used about 18 times a week, or 40 per cent of the time they could be used; laboratories about 11 times a week, or 25 per cent of the time. As for student stations, in general classrooms they are used about 9 times a week, and in labs about 7 times. This is 22 and 15 per cent of possible utilization on the basis of a 44-hour week. No matter which way it is juggled, this leaves a lot of empty classrooms and vacant seats. Worse to say, there is little reason to suspect that other colleges of this type or any other type do much better.

What are the factors that contribute to this low use?

An enumeration will show that most of them reflect traditional, time-worn patterns and practices. Revision will require abandonment of some carefully guarded traditions in the academic community.

1. Uneven Distribution of Classes by Days and Hours. One of the major causes of low utilization, and an area where change is obviously necessary, is the uneven distribution of class time. The data here show that peak loads of room and student-station use occur on Mondays, Wednesdays, and Fridays for recitations and lectures; on Tuesdays and Thursdays for laboratories. Facilities are used very little at the noon hour and on Saturday mornings. This, of course, is not new. It has been traditionally so. Certain hours of the day, too, have always been regarded as "the most desirable and convenient" -- class hours in the forenoon, labs after lunch. As a result, the daily schedule is telescoped into a few hours of the day.

2. Length of the Week. Another factor, related to the previous one, is the length of the school week. Many colleges function on the basis of a 36-hour week. In some cases economics will dictate that the academic week be extended to 44 hours or more.

3. The School Year. Still another leisurely pattern is the old custom of maintaining school in session for 9 or 10 months of the year. This may be a different aspect of the utilization problem, but it is nonetheless integral to the matter of providing more instructional space for the increased enrollments.

At a conference on utilization problems held earlier this year, John Dale Russell pinpointed some of the reasons for this pattern. On the matter of hourly, daily, weekly, and yearly use of facilities, he made the point that to a large extent this is beyond the control of the colleges themselves, and that the solution is to be found in the revision of attitudes on the part of employers, parents, and the general public. He put it this way:

"Many students take on part-time employment to finance their college education. They must fit class schedules into the hours of their employment . . . and also count on summer employment to finance their college education. Employers could do much to remedy this situation by making flexible adjustments in their work schedule for students.

"Parents of students . . . have a great deal to do with determining the popularity of certain hours of the day, days of the week, and times of the year. Parents like to encourage their children to take part in many activities while they're in college. Reportedly, advice is often given to the youngster going to college not to let his classes interfere with his education. The activities, of course, do tend to limit somewhat the hours when he's going to be free to take on his classes, especially if he's a good football player.

"Parents sometimes want their children to be free to come home on weekends. The child is not yet quite emancipated when he graduates from high school and enters college, and parents are not emancipated either. They want to see these children, so they arrange for them not to have any Friday afternoon classes so that they can come home for long weekends. Many parents want their children with them during the summer because that's vacation time, and we'll have one or two more vacations together before the kids get married, and then we don't see them any more. As a result, our summer sessions are very largely populated by those who are emancipated from their families. Spinster school teachers, for example, can go to summer session because they don't have the pull of Papa and Mama to get them back home and go up to the lake for the usual vacation.

"It's my conviction that the remedy for this very important cause of low utilization of instructional space in colleges and universities lies largely outside the academic institutions."

4. Division of Curriculum Units. Another factor, also traditional, which interferes with more efficient scheduling and utilization is the manner in which the curriculum is divided into varying units. That is, the tendency to schedule the three-credit courses on Monday-Wednesday-Fridays or the problem which is created with the introduction of a four-credit course.

Several innovations or departures from tradition in the matter of course units and scheduling have been tried quite successfully. For example, three-credit courses have been scheduled on Tuesdays and Thursdays in 75- or 80-minute periods. In some colleges, the curriculum is divided up into courses all consisting of three credits each, and then the schedule is staggered throughout the week so that a given class does not necessarily meet at the same hour on each of three days.

5. Class Occupancy Equivalent to Credits. An entrenched pattern in the academic world, and one that may cause considerable controversy if it is explored, has to do with the question of whether or not we should require room and student-station occupancies by students exactly equivalent to the number of semester hours of work which they carry. That is, a student who is enrolled for 15 semester hours of work almost invariably finds himself responsible for attending class for at least 15 clock hours. What this tradition really reflects is the fact that a college degree represents the number of hours that a student has occupied a seat in a classroom during his four years in college.

Again, to quote John Dale Russell, "The whole credit system which is our measure of whether or not you get a degree is tied completely to the sitting time of the student. He has to sit fairly successfully, of course, and especially during the final examination, but if he has not sat the required number of hours you're probably not going to give him a degree. Now, let's just frankly ask, is it absolutely necessary that a student sit under a college teacher for 15 hours a week, for 36 weeks a year, for 4 years, in order to achieve the bachelor's degree? Ask the question, why not 12 hours a week, why not 10? What is there sacred about 15 hours a week? I may say that some institutions violate these standards and have done so for many years. Perhaps we can devise alternative methods of demonstrating academic achievement."

Fortunately the beginnings of an increased emphasis on independent study are developing in our colleges. One example is a recent experiment at Michigan State University. During one term, in the fall of 1957, certain randomly selected sections in a four-credit course met for only three hours in formal class session. Guide questions were issued to this group for their one hour of independent study. The results of the experiment showed that this group of students received approximately the same average scores as did the traditional group. In terms of instructional space, it is evident here that the additional hour freed in this manner could be used by other classes meeting in the same room.

6. Laboratory Space. A query similar in nature to the last one, has to do with the extent to which laboratory space and equipment should be provided for the entire student body in order to meet the laboratory science requirement. In view of the increasing expense of laboratory equipment, the question may well be raised as to whether the sort of laboratory experience normally associated with the basic courses is to be desired for the non-science major in a college. That is, does our concept of general education in the sciences require that all students experience the laboratory in the same depth as the science majors?

This, of course, should not and cannot be answered in terms of cost and space utilization. The answer must come from educational philosophy. A practical approach to the more economic use of laboratory space, however, is the point that follows.

7. Inflexible Classrooms. There are two kinds of inflexibility, typically built into many rooms, which result in waste.

One is the rigidity of rooms which contain facilities that are unique and are therefore useful only in a very limited field of study. These rooms must be reserved for special courses. Most often the specialities make little demand on the rooms set aside for them because the number of students enrolled is low. At the same time, because of their unique nature, these rooms cannot be made available for other classes.

Laboratories are a good example of this. Characteristically they are single-use spaces specifically set up for work in either biology or physics or chemistry. In small liberal arts colleges where enrollment in these courses is low, the individual labs stand idle much of the time. By ingenious design arrangements of space and equipment, however, they could be multi-use spaces adaptable for service in a number of the science disciplines. This would reduce the total quantity of laboratory space needed and increase the utilization of those that were provided.

A second type of inflexibility that contributes heavily to low use is a high proportion of classrooms that are large in size. A room with 40 seats in it used most of the time by classes with half that many students represents a great deal of wasted space. Efficiency requires that spaces be interchangeable in their use and that there be a proper proportion of various room sizes — small rooms for seminars or little groups, large ones for lecture sections, and some that can be expanded from small to large and then reversed again when the need arises. The availability of economical, acoustically adequate operable walls to divide a room in two is another answer to this problem.

8. Proliferation of Courses. The division of subject matter into many courses offerings, especially in the smaller colleges, inevitably tends to lower the use of instructional space. When students are confronted by a large diversity of course offerings it naturally follows that some courses will attract only a small enrollment. On the basis of the data collected in this survey it is evident that the lowest percentages of utilization occur in those colleges which have the highest percentages of classes enrolling fewer than 10 students. In the colleges in this study, one-fifth of all classes are made up of fewer than 10 students.

9. Proprietary Attitudes. In many institutions, inefficient room and office arrangements evolve as the result of a feeling that a certain room "belongs" to a particular department or professor and may be used only for a certain area of study. Of course the convenience of students and faculty must be taken into account, but utilization is considerably improved when the responsibility for room assignments is lodged in a single administrative body. Assignments that emanate from a central office can be detached from special interest and can more easily be made on the basis of what is logical and workable for the entire institution rather than for any one professor or department.

10. Pressures for More Space. Finally, another cause of low utilization in most American colleges is one which grows out of our peculiar American mores. It is that a new building is a status symbol. John Dale Russell, in the speech referred to a few pages back, caricatured this point, and since laughter is not a bad beginning – or ending– here is how he put it:

". . . Pressures on an institution from outside and from within as well, are always in the direction of providing more plant space. The local community, the Chamber of Commerce, the constituency of the institution, they always look upon new buildings as the most tangible evidence of growth and prosperity. This is much more important to them than the employment of additional outstanding faculty members. You could hire a Nobel Prize winner on your faculty and not get near the publicity you would if you built a new shop for your maintenance crew in the average community.

". . . Department heads, deans, professors, all bring constant pressure on the administration of an institution to provide more space for their activities . . . Each school or college in the university and each department in a college ideally wants a building of its own, preferably with the name of the subject matter field over the portal to proclaim to the world the importance of that particular division of human knowledge. Not uncommonly, the form of appeasement that is necessary to retain a distinguished dean or professor when he gets an offer from some other institution is the provision of a new plant facility for his beloved speciality.

"A college president once said to me, and this sort of epitomized it, 'Before I took office here, not a single new building had been constructed on this campus for 27 years.' That, to him, was just devastating evidence of stagnation and decay until he took over. Of course it's been different since, as you can imagine.

"In fact, the president himself is probably one of the important factors that leads to pressures for more plant facilities. The president normally takes great pride in the new buildings *he* has constructed during his term of office. He always uses that pronoun. You walk into almost any president's office, and this has always been true, this is not just a phenomenon of the recent expansion in enrollment, and within an arm's reach of his desk there is always a portfolio of architect's drawings and plans for the new building.

"Somehow the pride the presidents take in the development of their physical plants reminds me of old King Nebuchadnezzar, way back in Babylon some twenty-five hundred years ago. If you've read the book of Daniel you have noted probably the words of King Nebuchadnezzar as he walked around his magnificent palace; and the King spake and said, 'Is not this the great Babylon which I have built for the royal dwelling place by the might of my power and for the glory of my majesty?' Those of you who know the Bible will recall that shortly after those proud words were uttered the King became insane. He had the humiliating experience of being found in the pasture field in the morning nibbling grass like an ox and he had quite a time before his sanity returned."

A REPORT FROM EDUCATIONAL FACILITIES LABORATORIES

SPACE UTILIZATION WORKBOOK

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in
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TO BUILD OR NOT TO BUILD

A Report on the
Planning and Utilization
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in
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Preface

College administrators are being called upon to make decisions as to how their institutions will meet the demands of rapidly encreasing enrollments. Often the decision they make involves the building of additional physical facilities. Before such a decision can be made responsibly, an institution must know how much space it already has and whether that space is being used to greatest advantage. An analysis is likely to indicate that its classrooms and laboratories stand idle more than half the hours during which classes are scheduled; that serious thought must be given to more efficient utilization of existing buildings before plunging into the expense of additional ones.

This work is a guide for colleges that wish to obtain a clear picture of how they are using their instructional space. The material in these pages falls into two parts.

The first is largely procedural. It tells a college the kinds of data to assemble for a space utilization study and provides forms on which to do so. These are accompanied by detailed instructions on how to compute the data in order to arrive at meaningful information. Upon completion of the step-by-step analysis, the staff of a particular college will know the quantity of instructional space available to it in terms of rooms, square feet, and student stations, the degree to which

these are actually being used relative to total possible use, and the days and hours of peak activity. (In this study, total possible use is represented as a 44-hour week. This does not mean that 44 hours is the optimum week for colleges. It is used simply because it provides a convenient reference base.)

The second part describes the level of utilization of classrooms and laboratories as reported for the fall of 1958 in 53 small liberal arts colleges, all with enrollments of fewer than 3,000. These levels are reported for the group as averages, percentages, and percentile ranges when appropriate. Blank spaces are provided with each table to enable a college to enter its own findings and readily compare them with the group as a whole. In this way an institution can immediately see whether it deviates markedly from the practice of similar institutions and pinpoint the nature of the divergence.

A word of caution on such comparisons:

The intent in presenting these data is to report the facts as they were observed in many small colleges in the north central region of the United States. As the prevailing facts, they provide a broad frame of reference for similar institutions. If a college finds that the level of its own utilization is below that of the colleges in the study, the divergence will ordinarily signify wasteful practice - although it is conceivable that a

particular institution may find the deviation in its own case to be desirable or necessary. A point to be underscored, however, is that <u>there is small comfort to be taken by those institutions whose utilization is equal to the average or above</u>. There is little cause for satisfaction in being as efficient as that which is not very efficient. A 40 per cent average utilization of classrooms and a 25 per cent average for laboratories - or even the highest prevailing use reported, 61 and 44 per cent respectively - leave a large margin for improvement.

The elements involved in a space utilization analysis obviously will not provide a complete study of an institution. In view of the critical problems faced by many colleges as a result of the student population explosion, however, these elements should be accorded serious consideration by an institution's administration and trustees.

The reader is reminded that though this workbook can be used independently of its accompanying text, <u>To Build or Not To Build</u>, it is recommended that that report be kept close at hand for ready reference. As the main body of this work, it provides the context for the analysis conducted by an individual institution, amplifies and interprets the bare figures, and sums up the implications of the findings.

Notes on the Collection of Data in Your College

The forms and procedures used to collect the utilization data reported in this study are not complex. They lend themselves readily to duplication and appear here as Forms A to E. The information required for them was found to be readily producible at the institutions which participated in the study. Their production, therefore, should not present difficulties for other interested faculties.

Form A, labeled "Room Use Survey", is the basic data collecting form. On it, all of the basic information necessary to a utilization study is brought together. One such sheet was prepared for each instructional room in each college reported upon here. Note that first the room was identified, then described in terms of student stations, and square feet, then classified.(1) The rest of the data are simply a report of the number of students using the room according to the clock hour and the day of the week.

Forms B to E are used for analysis of the basic information. As such, they are process or summary forms. Two of each should be employed, one to summarize the data for classrooms and the

---

(1) For convenience, a "student station" is defined as a desk, chair, or laboratory work space available for assignment to students. Similarly the room use classification was delimited to two categories - instructional laboratories and recitation-lecture classrooms. It is recognized that the categories selected do not include all the facilities used for instructional purposes, but in the small college these constitute the major portion of such space.

other for laboratories. (The reader will have to duplicate additional copies, as only one of each form is provided here.)

Form B provides a summary of the use of rooms and student stations within rooms, on a weekly basis, for each category of room.

Form C provides an analysis of this information according to days of the week. This describes the days of peak use for both rooms and student stations, and makes it possible to detect variations in the rate of scheduled utilization among the days of the week.

Form D structures the data for an hour-by-hour analysis, thus revealing those parts of the day which receive greatest or least use.

Finally, Form E assists in analysing the use of instructional facilities according to the size of the room.(2) Here the measures of utilization indicate which rooms, grouped according to size, are used more efficiently than others.

(2) The unit of size has been defined in terms of student stations as opposed to area.

FORM A ROOM USE SURVEY

Institution _____

Building _____ Room No. _____ No. of Student Stations A_____

Assignable square feet of floor area _____ Principal use of room _____

Number of Students Occupying Room Each Period It Is Used During the Week

Period of the Day	1 Monday	2 Tuesday	3 Wednesday	4 Thursday	5 Friday	6 Saturday	7 Total Student Station Occu.
7-8							
8-9							
9-10							
10-11							
11-12							
12-1							
1-2							
2-3							
3-4							
4-5							
5-6							
6-7							
7-8							
8-9							
9-10							

Total Student Station Occupancy						B

Note: This is a basic data-collecting form for a single room. A duplicate form must be provided for each instructional room in your institution.

I. Room Use:
   a. Total number of periods during week that the room is in use _____
   b. Average percentage of possible room-period use for week _____

II. Student-Station Use:
   a. Student hours per station for week _____
   b. Average percentage of possible student-station period use for week _____
   c. Average percentage of student stations occupied per room when room is in use _____

COMPUTATIONS FOR ITEMS I AND II ABOVE

Ia. A count of the number of periods (hours) that the room is reported in use.

Ib. The count of room-period uses (Ia) divided by 44 (the total possible room-period use) multiplied by 100. The standard of 44 is based on 5 days of 8 hours and a half day, 4 hours, on Saturday.

$$\frac{(Ia)}{(44)\ (100)}$$

IIa. The total student-station occupancies reported (B) multiplied by 100 divided by the number of student stations (A). $\frac{(B)\ (100)}{(A)}$

IIb. The total student-station occupancies reported (B) multiplied by 100, divided by the total possible student-station occupancies (the standard week multiplied by the number of student stations available, 44 x A).

$$\frac{(B)\ (100)}{(44)\ (A)}$$

IIc. The total student-station occupancies reported (B) multiplied by 100, divided by the product of the actual number of room periods used (Ia) and the available number of student stations (A). $\frac{(B)\ (100)}{(Ia)\ (A)}$

FORM B

SUMMARY OF UTILIZATION DATA BY KINDS OF INSTRUCTIONAL ROOMS ON A WEEKLY BASIS

Room Category _____

Room Identification		No. of Student Stations	Room Use: Weekly Basis			Student-Station Use: Weekly Basis		
Bldg.	Room No.		Total Room Periods of Use	Percentage of Possible Room-Period Use: 44 Hour Week	Total Student-Station Periods Occupied	Student Hours Per Station	Percentage of Possible Student-Station Use: 44 Hour Week	Percentage of Station Use When Room is Actually In Use
1	2	3	4	6	7	8	10	11
Total	*	*	*	X	*	X	X	X
Average	X	X			X			

*Report total number involved

Note: A duplicate of this form must be provided for each instructional building in your institution. Each form must have enough spaces to correspond with the number of rooms in the building. Use one set of forms for classrooms, another for laboratories.

SOURCES OF INFORMATION FOR COLUMNAR DATA ABOVE

Col.

1 Form A, preliminary paragraph
2 Form A, preliminary paragraph
3 Form A, item A
4 Form A, item Ia
7 Form A, total B

COMPUTATIONS FOR COLUMNAR DATA ABOVE

Col.

6 The sum of the total room periods of use (Col.4) divided by 44 hours multiplied by 100.

$$\frac{(\text{Col.4})}{(44)\ (100)}$$

8 The sum of the total student-station periods occupied (Col.7) divided by the sum of the number of student stations (Col.3).

$$\frac{(\text{Col.7})}{(\text{Col.3})}$$

10 The sum of the student-station periods occupied (Col.7) divided by the sum of the number of student stations (Col.3) multiplied by 100 and divided by 44.

$$\frac{(\text{Col.7})\ (100)}{(\text{Col.3})\ (44)}$$

11 Col.7 multiplied by 100 and divided by the product of Col.4 and Col.3.

$$\frac{(\text{Col.7})\ (100)}{(\text{Col.4})\ (\text{Col.3})}$$

Col.

4(Average) The sum of total room periods of use (Col.4) divided by the number of rooms (Col.2).

$$\frac{(\text{Col.4})}{(\text{Col.2})}$$

6(Average) The sum of Col.4 multiplied by 100 divided by the product of the total of Col.2 and 44.

$$\frac{(\text{Col.4})\ (100)}{(\text{Col.2})\ (44)}$$

8(Average) The sum of Col.7 divided by the sum of Col.3.

$$\frac{(\text{Col.7})}{(\text{Col.3})}$$

10(Average) The sum of Col. 7 multiplied by 100 and divided by the sum of Col.3 multiplied by 44.

$$\frac{(\text{Col.7})\ (100)}{(\text{Col.3})\ (44)}$$

11(Average) The sum of Col.7 multiplied by 100 and divided by the sum of the products of Col.4 and Col.3 for each room.

$$\frac{(\text{Col.7})\ (100)}{\left[(\text{Col.4})\ (\text{Col.3})\right]}$$

FORM C

SUMMARY OF INSTRUCTIONAL ROOM UTILIZATION BY DAYS OF THE WEEK

(Use one form for all classrooms, a duplicate for all labs)

A. Room Category_____Total Number of Rooms_____
B. Total available room periods each day, Monday through Friday, (8 hours per day multiplied by total number of rooms, A above) and on Saturday (4 hours multiplied by A above)_____
C. Total number of student stations in this category of rooms _____
D. Total available student-station periods each day, Monday through Friday, (8 x C above) and Saturday, (4 x C above)_____

Day of Week	Room-Period Use			Student-Station Period Use		
	Total Room Periods Used 1	Average Room Periods of Use for Day 2	Percentage of Possible Utilization Based on 44 Hour Week 4	Total Student-Station Periods Occupied 5	Average Student Hours Per Station 6	Percentage of Possible Utilization Based on 44 Hour Week 8
Monday						
Tuesday						
Wednesday						
Thursday						
Friday						
Saturday						

SOURCES OF INFORMATION FOR COLUMNAR DATA ABOVE

Col.

A. Form B, the total number of rooms (Col.2) (for appropriate room category)

C. Form B, the sum of Col.3 (for appropriate room category)

1. Form A, the count of room-period uses for each day, Cols. 1-6 respectively (for appropriate room category)

5. Form A, the sum of each column for each day of the week

COMPUTATIONS FOR COLUMNAR DATA ABOVE

Col.

2. Entry for each corresponding day on Col.1, this form, divided by Item A (total number of rooms). $\frac{\text{(Col.1)}}{\text{(A)}}$

4. Entry for each corresponding day on Col.1, this form, divided by Item B (number of room periods) multiplied by 44, multiplied by 100. $\frac{\text{(Col.1)}}{\text{(B) (44)}}$ (100)

6. Entry for each corresponding day on Col.5, this form, divided by Item C (total number of student stations in this category of rooms). $\frac{\text{(Col.5)}}{\text{(C)}}$

8. Entry for each corresponding day on Col.5, this form, divided by Item D (total available student-station periods), multiplied by 100.

$\frac{\text{(Col.5)}}{\text{(D)}}$ (100)

FORM D PERCENTAGE DISTRIBUTION OF TOTAL ROOM PERIODS SCHEDULED FOR EACH HOUR OF THE DAY AND OF TOTAL STUDENT-STATION-PERIOD OCCUPANCY FOR EACH HOUR OF THE DAY

Room Category_____
(Use one form for all classrooms, a duplicate for all labs)

Hours of the Day	Room-Period Use			Student-Station Period Occupancy		
	Total Number at Each Hour 1	Percentage of Total Used		Total Number at Each Hour 4	Percentage of Total Used	
		At Each Hour 2	Cumulative 3		At Each Hour 5	Cumulative 6
7-8	a_1	$\frac{(a_1)}{(t_1)}$ (100)		a_2	$\frac{(a_2)}{(t_2)}$ (100)	
8-9	b_1			b_2		
9-10	c_1			c_2		
10-11						
11-12						
12-1						
1-2						
2-3						
3-4						
4-5						
5-6						
6-7						
7-8						

8-9						
9-10						
Total	t_1	100.0	100.0	t_2	100.0	100.0

note: t_1 = sum of Column 1
t_2 = sum of Column 2

SOURCES OF INFORMATION AND COMPUTATIONS FOR COLUMNAR DATA ABOVE

Col.

1. Form A, a count of the entries in the row for 7-8 a.m. (etc. for other time period rows) for each room category.

2. This form, Col.1 divided by the total of Col.1, multiplied by 100. $\frac{(a_1)}{(t_1)}$ (100)

4. Form A, Col.7 for 7-8 a.m. (etc. for other time period rows) for each room category.

5. This form, Col.4 divided by the total of Col.4, multiplied by 100. $\frac{(a_2)}{(t_2)}$ (100)

FORM E

SUMMARY OF UTILIZATION OF INSTRUCTIONAL SPACE IN ROOMS ACCORDING TO SIZE OF ROOM

(Use one form for all classrooms, a duplicate for all labs)

Room Category_____

No. of Student Stations in Room	No. of Rooms of Each Size 1	Total Available Room Periods Based on 44 Hour Week 3	Total Student Stations in Each Group of Rooms 4	Total Available Student-Station Periods Based on 44 Hour Week 6	Total Room Periods Used 7	Average Room Periods Used for Week 8	Percentage of Possible Room Utilization Based on 44 Hour Week 10	Total Student-Station Periods Occupied 11	Average Student Hours per Week per Station 12	Percentage of Possible Student-Station Utilization Based on 44 Hour Week 14	Percentage of Station Use When Room Is In Use 15
1-10											
11-20											
21-30											
31-40											
41-50											
51-60											
61-80											
81-100											
101-150											
151-200											
201-250											
Over 251											

SOURCES OF INFORMATION AND COMPUTATIONS FOR COLUMNAR DATA ABOVE

Col.

1. Count the number of Forms A for each size in each category.

3. This form, Col.1 multiplied by 44. (Col.1) (44)

J

4. All Forms A in this category - classrooms or labs - the sum of Item A.

6. This form, Col.4 multiplied by 44. (Col.4) (44)

7. All Forms A in this category - classrooms or labs - the sum of Item Ia.

8. This form, Col.7 divided by Col.1. $\frac{\text{(Col.7)}}{\text{(Col.1)}}$

10. This form, Col.8 multiplied by 100 and divided by 44. $\frac{\text{(Col.8) (100)}}{\text{(44)}}$

11. All Forms A for each category - classrooms or labs - the sum of Item B.

12. This form, Col.11 divided by Col.6. $\frac{\text{(Col.11)}}{\text{(Col.6)}}$

14. This form, Col.12 multiplied by 100 and divided by 44. $\frac{\text{(Col.12) (100)}}{\text{(44)}}$

15. This form, Col.11 multiplied by 100 and divided by the product of Col.4 and Col.8. $\frac{\text{(Col.11) (100)}}{\text{(Col.4) (Col.8)}}$

INSTRUCTIONAL SPACE UTILIZATION DATA REPORTED BY 53 LIBERAL ARTS COLLEGES IN THE NORTH CENTRAL REGION OF THE UNITED STATES, FALL 1958

Using the method described in the preceding pages, the utilization practices of the colleges in this study were examined. The findings are presented in three general parts: first, the instructional facilities available in the colleges; second, the use of instructional rooms; third, the use of student stations. In each case provision is made for reporting the information of an additional college so that it can be most easily compared with the data reported for the colleges of the study.

TABLE 25 Instructional Space Available

Room Category		Number of Colleges Reporting	Full-Time Enrollment (1958)	Number of Rooms Reported	Number of Student Stations Reported	Total Square Feet Reported	Square Feet Per Student Station	Square Feet Per 100 Hours Occupancy	Square Feet Per Full-Time Student
1		2	3	4	5	6	7	8	9
Classrooms		53	42,852	1,203	50,649	818,351			
Range	Average						16.2	169.6	19.1
	High						35.5	406.2	60.5
	Low						11.0	97.1	6.7
Your College		X							
Laboratories		53	42,852	468	12,436	405,746			
Range	Average						32.6	452.0	9.5
	High						67.4	921.3	28.3
	Low						9.9	143.2	1.7
Your College		X							

Note: Column 8 is the quotient of the total square feet divided by the number of student-station occupancies multiplied by 100. As such, it describes the intensity of use of instructional facilities.

The concern here is to see the relationship between the space available for use and the need for space. One measure of the need for space is the square feet available per 100 hours of occupancy. This is actually a description of the intensity of use of the space that is available. As such, it provides a measure of the practical need based upon the use factor. Consequently, it offers a valuable index for administrators who are considering the need for new facilities. In presenting the measures of space available in these tables, there is no attempt to evaluate the practices of the colleges in providing space according to these factors. Rather, the average for all the colleges is reported, as is the range within which the colleges fell. It should be noted that the ranges are broad.

SUMMARY - YOUR COLLEGE (Check the appropriate column)				
Table 25	Classrooms		Laboratories	
	Above Mean	Below Mean	Above Mean	Below Mean
Column				
7				
8				
9				

TABLE 25a Percentile Ranking of Instructional Space Available

Percentile	GENERAL CLASSROOMS				TEACHING LABORATORIES			
	Square Feet Per Full-Time Student Enrollment		Square Feet Per 100 Hours of Occupancy		Square Feet Per Full-Time Student Enrollment		Square Feet Per 100 Hours of Occupancy	
	Study Colleges	Your College	Study Colleges	Your College	Study Colleges	Your College	Study Colleges	Your College
99	60.5		406.2		28.3		921.3	
90	35.1		296.7		16.1		781.9	
80	29.4		251.9		13.8		623.6	
70	25.8		223.0		12.5		585.9	
60	21.7		193.9		10.3		519.9	
50	19.5		168.0		9.4		475.8	
40	16.8		156.9		7.4		397.4	
30	15.5		143.8		7.0		339.9	
20	13.1		128.5		5.9		298.6	
10	12.0		112.2		4.2		269.0	
01	6.7		97.1		1.7		143.2	

Table 26 Room - Period Utilization

(Based on a 44 Hour Week)

Room Category		Number of Colleges Reporting	Number of Rooms Reported	Average Number of Periods of Use Per Room Per Week	Percentage of Possible Utilization of 44 Hour Week
1		2	3	4	5
Classrooms		53	1,203		
	Average			17.6	40
Range	High			26.8	61
	Low			9.3	21
Your College		X			
Laboratories		53	468		
	Average			10.8	25
Range	High			19.3	44
	Low			4.3	10
Your College		X			

Note: These data are drawn from Form B.

SUMMARY - YOUR COLLEGE (Check the appropriate column)				
Table 26	Classrooms		Laboratories	
	Above Mean	Below Mean	Above Mean	Below Mean
Column				
4				
5				

TABLE 26a Percentile Ranking of Room-Period Utilization Scores

Percentile	GENERAL CLASSROOMS				TEACHING LABORATORIES			
	Average Number of Periods Per Week Per Room		Percentage of Possible Utilization of a 44 Hour Week		Average Number of Periods Per Week Per Room		Percentage of Possible Utilization of a 44 Hour Week	
	Study Colleges	Your College	Study Colleges	Your College	Study Colleges	Your College	Study Colleges	Your College
99	26.8		61		19.3		44	
90	22.5		51		14.5		33	
80	20.0		45		13.0		30	
70	18.8		43		12.2		28	
60	17.7		40		11.3		26	
50	16.9		38		10.5		24	
40	16.3		37		10.1		23	
30	15.4		35		9.7		22	
20	14.3		33		8.8		20	
10	12.8		29		7.7		18	
01	9.3		21		4.3		10	

TABLE 26b Percentage of Possible Room-Period Occupancy by Days of the Week
(100% = 44 hours)

Room Category		Number of Colleges Reporting	DAYS OF THE WEEK					
			Monday	Tuesday	Wednesday	Thursday	Friday	Saturday (a.m.)
1		2	3	4	5	6	7	8
Classrooms		53						
Range	Average		47.2	35.9	45.4	36.6	44.0	11.4*
	High		71	57	78	67	63	98
	Low		24	17	27	20	20	1
Your College		X						
Laboratories		53						
Range	Average		26.1	30.8	25.5	29.5	19.4	2.3**
	High		50	94	44	88	35	19
	Low		6	8	6	8	2	4
Your College		X						

* Represents 31 colleges reporting classroom information.
** Represents 11 colleges reporting laboratory information.

Note: These data are drawn from Form C, Column 4.

SUMMARY - YOUR COLLEGE (Check the appropriate column)				
Table 26b	Classrooms		Laboratories	
	Above Mean	Below Mean	Above Mean	Below Mean
Column				
3				
4				
5				
6				
7				
8				

TABLE 26c Percentage of Possible Room-Period Occupancy by Hours of the Day

(100% = all rooms occupied at a given hour)

Room Category		Number of Colleges Reporting	HOURS OF THE DAY															
1		2	7-8* 3	8-9 4	9-10 5	10-11 6	11-12 7	12-1 8	1-2 9	2-3 10	3-4 11	4-5 12	5-6 13	6-7 14	7-8 15	8-9 16	9-10 17	10-11 18
Classrooms		53																
	Average		17.2	41.8	45.4	34.5	42.6	20.6	43.4	39.5	24.4	9.2	7.1	7.9	6.0	5.6	6.8	0.8
Range	High		45	68	75	60	68	52	80	70	68	47	34	47	47	47	32	-
	Low		1	8	1	2	18	1	2	2	2	1	1	1	1	1	1	-
Your College		X																
Laboratories	53																	
	Average		9.5	19.4	23.2	21.4	28.3	10.2	28.0	35.7	26.5	14.0	7.7	8.3	5.4	4.9	7.8	4.0
Range	High		23	58	58	53	47	30	60	80	80	37	34	50	28	28	22	-
	Low		1	5	3	8	7	2	4	5	5	2	1	1	1	1	3	-
Your College		X																

* In each case, the average and the range limits are for only the colleges reporting scheduled use.

Note: These data are developed from Form D, Column 2.

SUMMARY - YOUR COLLEGE (Check the appropriate column)				
Table 26c	Classrooms		Laboratories	
	Above Mean	Below Mean	Above Mean	Below Mean
Column				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				

A description of the use of student stations provides a necessary dimension in the utilization picture. Even though the use of instructional rooms might be considered adequate, it is entirely possible that total space is not being used as near capacity as might be possible, since the room use measure reflects only the extent to which rooms are used. It does not describe the extent of use of the seats or stations contained within a room. Thus a room may be counted as in use when a class is held in it, but will not reflect the unused space that results if the room contains 30 seats but is used by a class with only 15 members. From the measure of room-period use an institution can find out how many additional classes could be accommodated, but not how many additional students. For a more complete picture of the efficiency with which instructional space is used, it is necessary to use both the room-period and the student-station measure.

TABLE 27 Student-Station Utilization

(Based on a 44 Hour Week)

Room Category		Number of Colleges Reporting	Number of Student Stations Reported	Average Number of Student Hours of Use Per Station Per Week	Percentage of Possible Utilization of a 44 Hour Week	Percentage of Station Use When Room is Actually In Use
1		2	3	4	5	6
Classrooms		53	50,649			
	Average			9.5	22	51
Range	High			17.0	39	63
	Low			4.4	10	30
Your College		X				
Laboratories		53	12,312			
	Average			6.7	15	57
Range	High			21.9	50	92
	Low			2.6	6	26
Your College		X				

Note: These data are drawn from Form B.

Column 6 presents the intensity of use when room is actually occupied and thereby throws light on the question of size of rooms in relation to the size of classes meeting in them.

SUMMARY - YOUR COLLEGE (Check the appropriate column)				
Table 27	Classrooms		Laboratories	
	Above Mean	Below Mean	Above Mean	Below Mean
Column				
4				
5				
6				

TABLE 27a Percentile Ranking of Student-Station Utilization Scores

Percentile	GENERAL CLASSROOMS						TEACHING LABORATORIES					
	Average No. of Student Hours of Use Per Week Per Station		Percentage of Possible Utilization of a 44 Hour Week		Percentage of Student Stations Used When Rooms Are Actually in Use		Average No. of Student Hours of Use Per Week Per Station		Percentage of Possible Utilization of a 44 Hour Week		Percentage of Student Stations Used When Rooms Are Actually in Use	
	Study College	Your College	Study College	Your College	Study College	Your College	Study College	Your College	Study College	Your College	Study College	Your College
99	17.0		39		63.4%		21.9		50		91.7	
90	12.3		28		59.6		11.1		25		75.7	
80	11.0		25		58.1		9.4		21		71.3	
70	10.3		23		57.0		8.4		19		62.1	
60	9.6		22		54.4		7.4		17		56.9	
50	9.1		21		52.0		6.8		15		54.2	
40	8.6		20		50.7		6.2		14		52.3	
30	8.1		18		47.6		5.5		13		49.4	
20	7.0		16		44.5		4.3		10		45.1	
10	6.0		14		41.6		3.7		8		39.7	
01	4.4		10		30.3		2.6		6		25.6	

TABLE 27b Percentage of Possible Student-Station-Period Occupancy by Days of the Week
(100% = 44 hours)

Room Category		Number of Colleges Reporting	DAYS OF THE WEEK Monday	Tuesday	Wednesday	Thursday	Friday	Saturday (a.m.)
1		2	3	4	5	6	7	8
Classrooms		53						
	Average		37.8	26.8	36.5	27.9	36.2	6.3*
Range	High		50	36	51	48	52	59
	Low		13	10	12	8	13	0
Your College		X						
Laboratories		53						
	Average		15.5	20.1	14.7	20.2	11.8	1.2**
Range	High		37	65	35	63	29	11
	Low		1	5	2	7	1	1
Your College		X						

* Represents 31 colleges reporting classroom information.
** Represents 11 colleges reporting laboratory information.

Note: These data are drawn from Form C, Column 8.

SUMMARY - YOUR COLLEGE (Check the appropriate column)				
Table 27b	Classrooms		Laboratories	
	Above Mean	Below Mean	Above Mean	Below Mean
Column				
3				
4				
5				
6				
7				
8				

TABLE 27c Percentage of Possible Student-Station-Period Occupancy by Hours of the Day

(100% = all stations occupied at a given hour)

Room Category		Number of Colleges Reporting	HOURS OF THE DAY														
			7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10
1		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Classrooms		53															
	Average		9.4	24.4	25.6	18.4	23.7	11.8	23.7	20.6	12.3	4.5	3.5	3.5	3.0	2.6	3.7
Range	High		28	47	46	45	40	30	43	43	46	30	18	21	18	19	20
	Low		1	3	1	1	9	3	4	1	1	1	1	1	1	1	1
Your College		X															
Laboratories		53															
	Average		6.6	13.1	14.6	15.8	12.7	6.4	17.1	21.6	15.6	8.7	4.2	5.9	8.5	3.1	5.2
Range	High		30	41	33	50	44	25	53	53	53	32	30	30	38	14	13
	Low		1	1	1	2	1	1	3	4	2	1	1	1	1	1	1
Your College		X															

Note: These data are drawn from Form D, Column 5.

	SUMMARY - YOUR COLLEGE (Check the appropriate column)	
Table 27c	Classrooms Above Mean	Classrooms Below Mean	Laboratories Above Mean	Laboratories Below Mean
Column			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			

TABLE 28 Score Card of Utilization Practices in Your College

(Report the total of each Summary Table)

Source	Classrooms		Laboratories	
	Above Mean	Below Mean	Above Mean	Below Mean
Table 25 Instructional Space Available				
Table 26 Room-Period Utilization				
Table 26b Room Use by Days of the Week				
Table 26c Room Use by Hours of the Day				
Table 27 Student-Station Utilization				
Table 27b Student-Station Use by Days of the Week				
Table 27c Student-Station Use by Hours of the Day				

Use of the Score Card

This score card will enable the administration to pinpoint divergent utilization practices in your college - either those considered to be desirable or necessary, or those that have remained hidden in the maze of daily operation.

Questions:
Is the utilization of instructional space in your college lower than that of similar colleges? If so, can the divergence be justified? If it is equal to, or above that of similar colleges, how can it be further improved?

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